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Roadless Area Conservation

National Forest System Lands in Idaho

Specialist Report, Biological Evaluation, and Biological Assessment for Aquatic and Terrestrial Habitats and Species

Ann Carlson, EIS Team Aquatic Ecologist

Danielle Chi, EIS Team Wildlife Biologist

Marynell Oechsner, EIS Team Wildlife Biologist

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Abstract

This specialist report, biological evaluation (BE), and biological assessment (BA) provides the background and analysis for the affected environment and effects of the alternatives analyzed in detail for the Idaho Roadless Draft Environmental Impact Statement (DEIS). It describes the methodology, assumptions, and information used in the analysis of effects to terrestrial and aquatic habitats and species and overall biodiversity, which is summarized and disclosed in Chapter 3 of the DEIS.

Inventoried roadless areas in Idaho function as biological strongholds for populations of threatened and endangered species. They provide large, relatively undisturbed landscapes that are important to biological diversity and the long-term survival of many at risk species. Values that often characterize Idaho Roadless Areas include: high quality or undisturbed soil, water and air, sources of public drinking water, diversity of plant and animal communities, habitat for threatened, endangered, proposed, candidate, and sensitive species for those species dependent on large undisturbed areas of land, primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation, reference landscapes (areas that are relatively undisturbed), natural appearing landscapes with high scenic quality, and traditional cultural properties and sacred areas, and other locally identified unique characteristics (e.g. geological formations) (USDA Forest Service 2001).

The analysis includes evaluation of the Idaho Roadless Areas (IRAs) and their relationship to selected terrestrial and aquatic species (including T&E, Forest Service Sensitive and MIS) and their habitats. Terrestrial habitat characteristics considered in this analysis included: habitat availability, effectiveness, fragmentation, vegetation structure, human access, and disturbance.

Aquatic habitat characteristics considered in this analysis included both characteristics important for species sustainability and ecosystem integrity. Aquatic species key characteristics include: Threatened and Endangered (T&E) critical habitat, native fish strongholds, native fish priority watersheds, and bull trout core areas. In addition, characteristics of habitat integrity (e.g. water quality, channel processes, sediment regime, instream flows, riparian vegetation) were considered in relation to the proposed alternatives.

Potential indirect and cumulative effects to terrestrial and aquatic animal species and habitats from implementation of the alternatives were determined by considering the kinds and numbers of species potentially affected, identifying the important and sometimes unique characteristics of roadless areas that foster biodiversity, and evaluating the potential adverse and beneficial effects of road construction, road reconstruction, timber cutting and discretionary minerals activities on those characteristics. These effects are discussed for terrestrial and aquatic animal species and habitats. The cumulative effects of the alternatives were addressed by considering land

use and land conversion trends; laws, regulations, and policies that affect species, habitat characteristics, and biodiversity.

Consultation and Coordination

An integral part of the purpose and need identified for this project is the conservation of rare plant and animal species and communities. Both the NOAA -National Marine Fisheries Service (NMFS) and the U. S. Fish and Wildlife Service (USFWS), the agencies with oversight responsibilities for implementation of the Endangered Species Act (ESA), were extensively involved in the development and evaluation of alternatives. Although these agencies advised the Forest Service that a biological assessment is not required for ESA consultation on this kind of action, all pertinent and necessary supporting documentation, including a Forest Service biological evaluation, was submitted to them as part of consultation prior to publication of a final rule.

In addition to meeting the consultation requirements of ESA Section 7(a)(2), the Forest Service also requested programmatic review of the project under ESA Section 7(a)(1), which outlines the expectation established by ESA that Federal agencies "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species. The level of review that these agencies provide will be commensurate with the programmatic nature and national scale of the project.

The NMFS also has oversight responsibilities for implementation of the Magnuson-Stevens Fishery Conservation Act. The Forest Service provided NMFS with written documentation that, as none of the alternatives would result in any kind of ground disturbing activity, and are therefore not likely to affect Essential Fish Habitat, a need for further consultation under this Act was not anticipated.

Informal consultation and conferencing on the proposed Forest Service Roadless Conservation project have occurred through discussions among Forest Service, USFWS and NMFS biologists. On June 21, 2007, the Forest Service discussed with USFWS and NMFS the intent of the Forest Service to seek programmatic review of the conservation merits relative to TEP species of both the prohibitions and the procedures components of the proposed alternatives under section 7(a)(2) of the ESA. USFWS and NMFS suggested that the Forest Service provide a written statement of the proposed action and request what type of consultation or documentation would be appropriate for the Idaho Roadless EIS.

The following individuals from NMFS and USFWS are actively involved in informal discussions or provided correspondence during the Roadless Area Conservation Project planning:

Ted Koch, USFWS, Biologist, Boise Idaho

David Mabe, NOAA, NMFS, Biologist, Boise Idaho

Methodology

The purpose of the analysis in this terrestrial and aquatic habitat and species specialist report is to evaluate the differences between three proposed alternatives concerning management of Inventoried Roadless Areas within the State of Idaho. The three alternatives include (See Chapter 2 for a detailed description of the alternatives):

1) 2001 Roadless Rule (No Action)

2) Existing Forest Land and Resource Management Plans (Existing Plans)

3) Idaho Roadless Rule (Proposed Action)

It is important to recognize that any activities proposed for roadless areas, such as timber harvest and road construction, would require project site-specific NEPA analysis. Because this analysis of the Idaho Roadless alternatives does not address specific actions or projects it is a broader analysis that hypothesizes on potential outcomes of implementing alternative prohibitions and permissions across all Idaho Roadless Areas. In other words, there are no on-the-ground actions linked to this decision and therefore no direct effects would result from this decision. The analysis relied heavily on a review of current scientific literature on the direct and indirect effects of roads, road construction, timber harvest, and discretionary mineral activities on species and their habitats, with potential effects described in terms of relative risks. The analysis provided in this specialist report includes Federally listed Threatened and Endangered Species (T&E) and their critical habitat, Forest Service Sensitive species and Management Indicator species (MIS).

The principal sources of data used for the analysis included species lists developed by Regions 1 and 4 for federal T&E species, Forest Service Sensitive Species, and Management Indicator Species (MIS); Idaho Comprehensive Wildlife Conservation Strategy (Idaho Department of Fish and Game 2005); Forest Plans for Idaho Forests including: Idaho Panhandle, Clearwater, Nez Perce, Payette, Salmon-Challis, Sawtooth, Targee, Boise, and Caribou; the 2001 Forest Service Roadless Area Conservation Final EIS (USDA Forest Service 2000a) and the Roadless Area Conservation Final EIS Specialist Reports (USDA Forest Service 2000b).

Species List(s) Compilation

Threatened, Endangered or Proposed Species – Species listed as endangered, threatened or proposed under the Endangered Species Act

- Species lists provided by Regions 1 and 4 were used to develop a combined list of threatened and endangered (T&E) species that are known to occur or have suitable habitat on the National Forests within Idaho. There are no known proposed (P) species within Idaho. Species distribution maps developed by Idaho Fish and Game Conservation Data Center (ID CDC) were used to identify which species are likely to occur or have habitat within Idaho Roadless Area. This information was used to establish a species list for ESA Section 7(a)(2) consultation and to complete the biological assessment for the DEIS (Tables 1 and 19). For species that are not likely to occur or have habitat within Idaho Roadless Areas, consideration was given to potential effects from activities that could occur in the Idaho Roadless Areas (e.g. road construction or reconstruction) that could have effects outside of the Idaho Roadless Area (for example a fish species downstream outside of the Idaho Roadless Area).

Forest Service Sensitive Species

- Regional Forester-Designated Sensitive Species lists provided by Regions 1 and 4 were used to develop a combined list of Forest Service Sensitive that are known to occur or have suitable habitat on the National Forests within Idaho. Species distribution maps developed by ID CDC were used to identify which species are likely to occur or have habitat within Idaho Roadless Areas (Tables 1 and 20). For species that are not likely to occur or have habitat within Idaho Roadless Areas, consideration was given to potential effects from activities that could occur in the Idaho Roadless Areas that could have effects outside of the Idaho Roadless Area. The biological evaluation included in this specialist report addresses Forest Service Sensitive species and utilizes a coarse-filter approach (analysis of ecological conditions), in combination with some supplemental species-specific information.

Forest Management Indicator Species

- Management Indicator Species (MIS) are identified by each Forest in their Forest Plan. A MIS list was compiled from the Forest Plan lists for this analysis (Tables 13 and 22). Most of the MIS species are also on the Forest Service Sensitive Species list. Evaluation of MIS species is included in this specialist report.

Assumptions

Key assumptions used in this analysis included:

- Road construction, reconstruction, and timber harvest in Idaho Roadless areas over the past five years has been minimal and has not resulted in a change to the roadless character of the Idaho Roadless Areas (trend and projection data provided by the Forests, Spring 2007). Given current and projected future budgets road construction, reconstruction, and timber harvest is likely to continue in Idaho Roadless Areas at low rates similar to the past five years.
- Discretionary mineral activities may increase in some Idaho Roadless Areas due to mineral resource demands to meet energy needs.
- Areas with low road densities are better for aquatic resources than areas with higher road densities (Furniss et al. 1991, Lee et al. 1997, McCaffery et al. 2007).
- Areas with more ground cover are better for aquatic resources because they have less surface erosion and lower sedimentation in aquatic habitats (Conroy et al. 2006). Ground

cover is often reduced from road construction, road reconstruction, timber cutting and discretionary minerals activities. (Meehan 1991).

Conservation rules of thumb:

- The larger the population's size, the greater the chance of persistence.
- Interconnected populations that form a metapopulation are better than fragmented isolated populations.
- Recovery potential is greater the closer you are to a source population.
- Preserving genetic and phenotypic diversity requires maintaining populations through a wide geographic range in a variety of habitats.

Numbers used in this report:

- Idaho contains 52,961,000 total acres (Curley et al. 2004)
- 7% or 4,005,653 acres is in wilderness (Curley et al. 2004)
- 9.3 million acres of Idaho Roadless Areas are National Forest System Lands (Petition of Governor James E. Risch 2006)
- 250 Inventoried Roadless Areas in Idaho

Information Used

Region 1 TEP and Sensitive species list (3/31/2005)

Region 4 TEP and Sensitive species databases (December 2003, with technical edits July 2004)

Idaho Comprehensive Wildlife Conservation Strategy (Idaho Department of Fish and Game 2005)

Forest Land and Resource Management Plans for:

- Idaho Panhandle National Forest (1987)
- Clearwater National Forest (1988)
- Nez Perce National Forest (1988)
- Payette National Forest (2003)
- Salmon-Challis National Forest (1987)
- Sawtooth National Forest (2003)
- Targee National Forest (1999)
- Boise National Forest (2003)
- Caribou National Forest (2003)

Petition of Governor James E. Risch for Roadless Area Management in Idaho, October 5, 2006 (State of Idaho 2006)

Forest Service Roadless Area Conservation Final Environmental Impact Statement (USDA Forest Service 2000a)

Federal Register Special Areas; Roadless Area Conservation: Final rule and Record of Decision (USDA Forest Service 2001)

Specialist Report for Terrestrial and Aquatic Habitats and Species November 2000 (USDA Forest Service 2000b)

Interim Strategy for Managing Fish Producing Watersheds in Eastern Oregon, Washington, Idaho, Western Montana, and portions of Nevada, 'INFISH' (USDA and USDI 1995a)

Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California, 'PACFISH' (USDA and USDI 1995b)

Biological Opinion for the effects to bull trout from continued implementation of land and resources management plans and resource management plans as amended by the Interim Strategy for Managing Fish Producing Watersheds in Eastern Oregon, Washington, Idaho, Western Montana, and portions of Nevada (INFISH) and the Interim Strategy for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH) (USDI FWS 1998a)

Biological Opinion: Land and resource management plans for National Forests and Bureau of Land Management resource areas in the Upper Columbia River Basin and Snake River Basin evolutionary significant units (USDC NOAA 1998)

An assessment of ecosystem components in the Interior Columbia Basin and portions of the Klamath and Great Basins Volume III (USDA and USDI 1997)

Forest Ecosystem Management: An Ecological, Economic, and Social Assessment report of the Forest Ecosystem Management Assessment Team, 'FEMAT' (USDA et al. 1993).

The Interior Columbia Basin Ecosystem Management Project: Science Assessment (USDA and USDI 1999).

The Lynx Conservation Strategy and Assessment (Ruediger et al. 2000)

The Northern Rockies Lynx Amendment (USDA Forest Service 2007)

Current literature – see References cited section.

Organization of this Document

- Aquatic Animal Habitats and Species
- Terrestrial Animal Habitats and Species
- Cumulative Effects for Terrestrial and Aquatic Habitats and Species

Aquatic Animal Habitats and Species: Affected Environment

BACKGROUND

The State of Idaho contains numerous rivers, streams, and lakes. Most of Idaho is included in the Interior Columbia River Basin with the exception of the Bear River Basin, in southeast Idaho which is part of the Great Basin and flows into the Great Salt Lake. Idaho Roadless Areas support a diversity of aquatic habitats and communities, including habitat for 17 aquatic Threatened, Endangered, and Forest Service Sensitive species (TES) and numerous other native aquatic species including fish, amphibians, and invertebrates. There are 170 roadless areas that are within the range for aquatic threatened and endangered species (Table 1)

Table 1: Aquatic TES Species with Ranges Overlapping Idaho National Forest Inventoried Roadless Areas

Species	Status	Boise	Caribou	Challis	Clearwater	Idaho Panhandle	Nez Perce	Payette	Salmon	Sawtooth	Targhee
Fish											
Sockeye salmon (Snake River) *(Oncorhynchus nerka)*	E			X			X	X	X	X	
White sturgeon (Kootenai River system) (*Acipenser transmontanus)*	E					X					
Bull trout (*Salvelinus confluentus)*	T	X		X	X	X	X	X	X	X	
Chinook salmon (Snake River spr/sumr run) (*Oncorhynchus tshawytscha)*	T	X		X	X		X	X	X	X	
Chinook salmon (Snake River fall run) (*Oncorhynchus tshawytscha)*	T						X	X			
Steelhead trout (Snake River) (*Oncorhynchus mykiss)*	T	X		X	X		X	X	X	X	
Bonneville cutthroat trout (*Oncorhynchus clarkii utah)*	S (R4)		X								
Burbot *(Lota lota)*	S (R1)					X					
Inland redband trout (*Oncorhynchus mykiss gairdneri*)	S (R1)	K		K	X	X	X	K	K	K	
Pacific lamprey (*Lampetra tridentata)*	S (R1)	K		K	X		X	K	K	K	
Chinook salmon (Snake River) (*Oncorhynchus tshawytscha)* (naturalized pops)	S (R1)				X		X				
Fine-spotted Snake River cutthroat trout (Yellowstone cutthroat trout) *(Oncorhynchus clarkii behnkei)*	S (R4)		X								X
Westslope cutthroat trout (*Oncorhynchus clarkii lewisi)*	S (R1) S (R4)	X		X	X	X	X	X	X	X	
Wood River sculpin (*Cottus leiopomus)*	S (R4)									X	
Amphibians											
Western toad (*Bufo boreas)*	S (R1)	K	K	K	X	X	X	K	K	K	K

Species	Status	Boise	Caribou	Challis	Clearwater	Idaho Panhandle	Nez Perce	Payette	Salmon	Sawtooth	Targhee
Coeur d'Alene salamander *(Plethodon idahoensis)*	S (R1)				X	X	X				
Columbia spotted frog (*Rana luteiventris)*	S (R4)	X		X	K	K	K	X	X	X	X

E = Federal Endangered
T = Federal Threatened
S = Forest Service Sensitive, (R1) = Region 1, (R4) = Region 4
X = Known occurrences and/or Range overlaps Idaho Roadless Area
K = Known to occur and/or Range overlaps Idaho Roadless Area, (K = Amphibians not Forest Service Sensitive in the Region but known to occur)

The Columbia Basin fisheries in Idaho are world renowned for their salmon, steelhead, and native trout populations. The Bear River Basin, including Bear Lake and its tributaries support several endemic species, including Bonneville cisco, Bonneville whitefish, Bear Lake white fish, and Bear Lake sculpin. In addition, the fisheries resources of the state are very important for the Tribes in Idaho. Idaho is recognized by 6 federally-recognized tribes: Coeur d'Alene, Kootenai, Nez Perce, Shoshone-Bannock, Shoshone-Paiute, Northwestern Band of Shoshoni Nation of Utah (Washakie). Most of the native fish populations in Idaho have suffered declines. Similarly native amphibians such as the Coeur d'Alene salamander, western toad and Columbia spotted frog have also experienced population declines.

Human activities since the late 1800s have altered much of the landscape across Idaho. Clearing of streams for passage of boats and milling of logs downstream reduced habitat complexity and the connection between streams and their floodplains. Dams and diversions resulted in dramatic changes to stream conditions and the passage of aquatic species upstream and downstream. Ground disturbing activities such as mining, road building, and logging have resulted in higher sediment loading to streams and channel alterations that often times resulted in unfavorable conditions for aquatic species (Meehan 1991). In the Interior Columbia Basin (including most of Idaho) the ecological integrity of streams, lakes, and wetlands was significantly compromised by the late 1920s (Lee et al. 1997). Increasing human population, technological advances (for example, centrifugal pumps), and availability of heavy equipment after World War II greatly accelerated the development of new irrigation projects, timber harvest, dam construction, and road building (Lee et al. 1997). Individually and inn combination, these activities continued to fragment and compromise the remaining hydrologically connected and vegetated reaches of streams (Lee et al. 1997).

Features of altered ecosystems include changes (generally reductions) in species diversity, changes in species distributions, and losses of habitat types or ecosystem states (Reeves et al. 1995). Native salmonid assemblages are simplified in watersheds that have been impacted by various human activities (Reeves et al. 1995). Large blocks of unroaded areas, such as inventoried roadless areas, while having relatively more intact aquatic habitat, may still support isolated aquatic populations because of road-related effects and other causes of habitat alteration in adjacent areas (USDA Forest Service 2000b).

This assessment of the Idaho Roadless Areas and Roadless Area management alternatives in relation to aquatic resources focuses on five main datasets: 1) *Fish Strongholds* as identified by the Interior Columbia Basin Ecosystem Management Project (ICBEMP) (USDA and USDI 1997), 2) ESA *Priority Watersheds* (HUC 6) as identified through the consultations on the Inland Native Fish Strategy (INFISH) (USDA and USDI 1995a), the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH) (USDA and USDI 1995b), 3) Maps of *bull trout core areas* (USDI Fish and Wildlife Service 2005) and the State of Idaho Bull Trout Conservation Plan (Batt 1996), 4) *Forest Service Sensitive Species* distributions and ranges for Regions 1 & 4 (includes fish and amphibian species), and 5) Idaho Department of Fish and Game, Conservation Data Center *Species of Greatest Conservation Need* (Idaho Department of Fish and Game 2005).

The Idaho Comprehensive Wildlife Conservation Strategy (Idaho Department of Fish and Game 2005) identified species of greatest conservation need. Many of the aquatic species already selected for this analysis because of their federal or Forest Service status are also identified as State species of greatest conservation need. Aquatic species used in this analysis of Idaho Roadless Area alternatives are listed in Table 2 and are worth special note because of their status in the State of Idaho.

Table 2: State of Idaho Status for Species Used in this Analysis of Idaho Roadless Area Alternatives

Species	Status
Fish	
Sockeye salmon (Snake River) (*Oncorhynchus nerka)*	S1
White sturgeon (Kootenai River system) (*Acipenser transmontanus)*	S1
Bull trout (*Salvelinus confluentus)*	S3
Chinook salmon (Snake River spr/sumr run) (*Oncorhynchus tshawytscha)*	S1
Chinook salmon (Snake River fall run) (*Oncorhynchus tshawytscha)*	S1
Steelhead trout (Snake River) (*Oncorhynchus mykiss)*	S3
Bonneville cutthroat trout (*Oncorhynchus clarkii utah)*	S3
Burbot *(Lota lota)*	S1
Inland redband trout (*Oncorhynchus mykiss gairdneri*)	S4
Pacific lamprey (*Lampetra tridentata)*	S1

Species	Status
Chinook salmon (Snake River) (*Oncorhynchus tshawytscha)* (naturalized pops)	S1
Fine-spotted Snake River cutthroat trout (Yellowstone cutthroat trout) *(Oncorhynchus clarkii behnkei)*	S2
Westslope cutthroat trout (*Oncorhynchus clarkii lewisi)*	S3
Wood River sculpin (*Cottus leiopomus)*	S2
Amphibians	
Western toad (*Bufo boreas)*	S3
Coeur d'Alene salamander *(Plethodon idahoensis)*	S2
Columbia spotted frog (*Rana luteiventris)*	S2

S1 = State Critically Imperiled: at high risk because of extreme rarity, rapidly declining numbers, or other factors that make it particularly vulnerable extirpation in the state.
S2 = State Imperiled: at risk because of restricted range, few populations, rapidly declining numbers or other factors that make it vulnerable to rangewide extinction or extirpation.
S3 = State Vulnerable: at moderate risk because of restricted range, relatively few populations, recent and widespread declines, or other factors that make it vulnerable to rangewide extinction or extirpation.
S4 = State Apparently Secure: uncommon but not rare (although it may be rare in parts of its range)., and usually widespread. apparently not vulnerable in most of its range, but possibly cause for long-term concern.

Other Idaho aquatic species of greatest conservation need not specifically included in this analysis include a variety of organisms including mollusks, insects, amphibians and fish. The species included in this analysis (Table 2) serve as a surrogate for this larger group of cold water species. The cold water group requires stream environments that have clean, cold water. Salmonid species are considered useful surrogates for aquatic invertebrates. Lee et. al. (1997) in the Interior Columbia Basin assessment provided several reasons for focusing on salmonid species as cold water biota indicators. These include:

a. More is known about them, and therefore are more likely to discern important environmental relationships.

b. They are widely distributed, which allows for broad-scale comparisons.

c. They act as predators, competitors, and prey for a variety of other aquatic and terrestrial animals. Thus they are likely to influence the structure and function of aquatic ecosystems.

d. They are potentially more sensitive to disturbance than other species groups.

Inventoried roadless areas are key to recovery of salmon and steelhead stocks in decline, providing habitat to protect species until longer-term solutions can be developed for migration, passage, hatchery, and harvest problems associated with the decline of anadromous fish (USDA Forest Service 2001). Aquatic resources in Idaho would benefit from systematic conservation planning (Margules and Pressey 2000). A systematic approach to conservation planning has many advantages including being strategic versus ad hoc therefore being more efficient, providing early identification of critical conservation elements through design, and the ability to focus on priority areas for conservation. The Idaho Roadless Areas could provide a foundation for systematic conservation planning in Idaho related to aquatic species. Through the maintenance of Roadless Area characteristics, a network of aquatic reserves could be designated which could provide for biodiversity. Roadless Areas in Idaho function as biological strongholds for populations of threatened and endangered species. They provide large, relatively undisturbed landscapes that are important to biological diversity and the long-term survival of many at risk species. Currently Roadless Areas in Idaho have a very low level of human disturbance which is reflected in the favorable conditions for aquatic species.

Aquatic Species Status: General

Examples of native fish declines in Idaho include Snake River populations of Chinook salmon (Threatened), sockeye salmon (Endangered), and steelhead trout (Threatened). These fish populations have declined so severely that they are federally listed under the Endangered Species Act. Bull trout (Threatened), once widely distributed in Idaho have lost 46% of their historic range (Curley et al. 2004). Genetically pure populations of Yellowstone cutthroat trout are limited to a fraction of their historical stream habitat in the upper Snake River drainage (Gresswell 1995, Varley and Gresswell 1988). Westslope cutthroat trout have lost 16% of their historic range in Idaho (Curley et al. 2004) and are listed as a State Species of Greatest Conservation Need and a Forest Service Sensitive species in both Regions 1 and 4. In addition, only a small portion of the historic range of westslope cutthroat trout sustains genetically pure populations (McIntyre and Rieman 1995, Rieman and Apperson 1989).

Many factors have contributed to the decline of Idaho fishery resources. Dams and hydroelectric operations, introductions of hatchery and other non-native species, excessive harvest, and changes in aquatic and riparian habitat have been identified (Lee et al. 1997). Reduction in freshwater habitat quality and quantity and alteration of riparian areas, however, are a consistent and pervasive problem facing aquatic resources (Meehan 1991, Nehlsen et al. 1991, Thurow et al. 1997, Williams et al. 1989, Young 1995).

Idaho native amphibians play an important ecological role in transferring energy up the food chain and shaping terrestrial and aquatic communities. In addition they may serve as valuable bioindicators of the health of certain environments. In recent years, over two hundred amphibian species around the world, including several in Idaho, are known or suspected to have undergone declines. Direct and indirect impacts from a variety of human activities may affect the viability of amphibian populations. Because they have complex life cycles with life history stages that require specific breeding, foraging, and over-wintering habitats that may be spatially separate, management actions designed to ensure population viability must consider a complex set of habitats and a complex set of human activities that may present a risk to one or more life history stage (Maxell 2000, Werner et al. 2004).

In Idaho, western toad, Coeur d'Alene salamander, and Columbia spotted frog have experienced declines in their populations to the extent that they are now identified as Forest Service Sensitive Species and/or Species of Greatest Conservation Need by the State of Idaho. Idaho Roadless Area may provide some refuge for these species from disturbances related to roads, timber cutting and mining.

Anthropogenic disturbances such as logging and road related activities have been shown to affect amphibian populations. In a study of four streamside amphibians in Oregon and Washington, Corn and Bury (1989) reported that only 1 of 20 streams in logged stands contained all four species as compared to 11 of 23 streams in uncut stands. Furthermore, only 2 of the streams in the uncut stands had fewer than three species, whereas 11 streams in the logged stands had only 1 or no species present. Coeur d'Alene salamanders are particularly sensitive to timber harvest because of their dependence on cool, moist microhabitats that are often altered by timber harvest (Maxell 2000). Finally, it should be noted that many of the negative impacts associated with timber harvest may be associated with the building and maintenance of roads and road traffic. For instance sedimentation of streams has major impacts on stream dwelling amphibians (Welsh and Lind 1998) and 90% of the sediment runoff from some harvest operations comes from roads (Anderson et al. 1976).

AQUATIC ECOSYSTEMS

Approximately 32% of Idaho is roadless including: congressionally mandated wilderness (7%), National Forest Inventoried Roadless (18%), and BLM roadless (7%). The 9.3 million acres identified for Forest Service Inventoried Roadless Areas in Idaho can play an important role in the condition of aquatic ecosystems and aquatic species across the state. Idaho Roadless Areas can provide watershed areas that are relatively free of road construction and reconstruction, timber harvest and discretionary mineral activities. Roadless areas if managed for minimal ground disturbance can provide for the hydrologic function of rivers and streams and features that serve as important habitat for aquatic life. In Idaho areas free of these types of anthropogenic disturbances outside of wilderness areas are unique.

Key aquatic ecological characteristics that contribute to aquatic/riparian ecosystem integrity include (Furniss et al. 1991, USDA et al. 1993 (FEMAT)):

- Riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geographic region.
- Habitat to support diversity and productivity of native and non-native plant, vertebrate, and invertebrate populations that contribute to the viability of aquatic- and riparian-dependent communities.
- Habitats and conditions that discourage and prevent the establishment and spread of invasive species.

- Water quality, including temperature, to a degree that provides for stable and productive riparian and aquatic ecosystems.
- Stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which riparian and aquatic ecosystems developed.
- Instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges.
- Natural timing and variability of the water table elevation in meadows and wetlands.
- Riparian vegetation to:
    - Provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
    - Provide adequate summer and winter thermal regulation within the riparian and aquatic zones; and
    - Help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed.

These characteristics are becoming scarce in an increasingly developed landscape. Inventoried Roadless Areas on National Forest system lands in Idaho provide an opportunity to manage for ecological integrity and larger undisturbed landscapes. Idaho contains more wild and remote public land than any state outside of Alaska (Curley et al. 2004).

Waters in inventoried roadless areas have been shown to function as biological strongholds and refuges for many fish species (Lee et al. 1997). Smaller streams, such as many of those found in inventoried roadless areas, provide important habitat for resident and migratory aquatic species and also influence the quality of habitat in larger, downstream reaches (Chamberlin et al. 1991). Subwatersheds that support strong populations of native salmonids are likely to represent a fortuitous balance of habitat quality, climate, geologic constraint, and geographic location which effectively minimize cumulative threats to the species (Lee at al. 1997).

Strong fish populations that include the most productive, abundant and diverse populations are likely to be most resilient to environmental disturbance and most likely to survive and recover from catastrophic disturbance (Rieman et al. 1993). Idaho's Roadless Areas provide for aquatic species strongholds and opportunities to better understand aquatic and riparian ecosystems that have experienced minimal disturbance. Strong populations of native fish are critical for short-term persistence and long-term recovery.

BIODIVERSITY

In the ecological literature, diversity refers to both the number of species present and their relative abundance. Thus, an area with many abundant species is more "diverse" than an area with an equal number of species, few of which are abundant and most of which are rare. A relative measure of Idaho's aquatic biodiversity is shown in Table 3.

Table 3: Idaho's Biodiversity Rank Relative to the 50 U.S. States and the District of Columbia (Source: Stein et al. 2000)

Category	Rank	Number of Species/ % at Risk
Amphibian diversity	48	12 species
Amphibian risk	19	8.3% at risk
Freshwater fish diversity	47	42 species
Freshwater fish risk	10	19.0% at risk

The number of native species present in a watershed is an important element of diversity, and reflects heterogeneity in the physical environment (Lee et al. 1997). A high degree of species overlap might reflect strong habitat diversity. Even with a fairly narrow group like salmonids, each species relies on different habitats and environments, with variable and wide-ranging life-history patterns. The co-occurrence of several salmonids suggests suitable habitats exist over relatively large landscapes, not just those tied to the local subwatershed. High richness may also indicate critical common areas that serve as corridors, wintering areas, or seasonal refuges for the varied life histories in the assemblage. The loss of such areas could portend a loss of richness on both local and regional scales.

The size of an area, kinds and intensity of management-induced and natural disturbances that have occurred, and the landscape context in which it is found, all affect the quality, distribution, and extent of these habitats. Some of these waters may now play a relatively much greater role in supporting aquatic species viability and biodiversity than in the past due to cumulative degradation and loss of other, potentially more biologically rich habitat within associated drainages.

ESA THREATENED AND ENDANGERED SPECIES

Threatened and Endangered aquatic species that occur in Idaho include steelhead, spring/summer-run Chinook salmon, fall-run Chinook salmon, bull trout, sockeye salmon, and white sturgeon (Kootenai River system).

Two documents guide the management of these 6 federally listed fish species on National Forest system lands: 1) Interim Strategy for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California 'PACFISH' (USDA Forest Service 1995b), and 2) Inland Native Fish Strategy ' INFISH' (USDA and USDI 1995a). PACFISH and INFISH standards and guidelines apply to all NFS lands within the analysis area.

Table 4 displays acres of threatened and endangered fish species range in Idaho and the percent overlap of the range with the Idaho Roadless Areas.

Table 4: Acres of Threatened & Endangered Fish Species Range in Idaho and Percent Overlap with Idaho Roadless Areas (IRAs)

Species	Acres of species range in Idaho	Percent of species range in Idaho that overlaps with IRAs
Steelhead	11,533,641	27%
Spring/summer-run Chinook	10,512,781	28%
Fall-run Chinook	790,388	5%
Bull trout	16,746,193	33%
Sockeye	1,655,688	21%
Kootenai white sturgeon	167,814	10%

All Idaho Roadless Areas that support threatened and endangered fish species are listed in Appendix A.

The following threatened and endangered fish species information is from the Idaho Comprehensive Wildlife Conservation Strategy (Idaho Department of Fish and Game 2005).

Steelhead Trout

Steelhead, which are the anadromous life form of rainbow/redband trout, were historically found along the west coast of North America from southern California to central Alaska. the Interior Columbia River basin steelhead ranged from east of the Cascades upstream in the Columbia River and tributary streams to natural geologic barriers such as Shoshone Falls on the Snake River (Behnke 2002). In Idaho, steelhead had access to most of the Clearwater, Salmon, Weiser, Payette, Boise, Owyhee, Bruneau, and Salmon Falls Creek drainages. Populations using the tributaries above Hells Canyon Dam were eliminated with the construction of the Hells Canyon complex in the 1950s and earlier upriver dams. Currently, wild and hatchery steelhead are found in the Snake River below Hells Canyon Dam, Clearwater, and Salmon River drainages. Steelhead in the Snake River drainage were listed as threatened under ESA in 2006 (USDC NOAA 2006). About 100 roadless areas in Idaho have habitat that supports steelhead trout.

Steelhead spawn and rear in stream and small river habitat similar to other of slightly larger systems used by resident rainbow/redband trout. Spawning streams need clean gravels for successful egg development and fry emergence. The majority of steelhead returning to Idaho cross Lower Granite Dam during September-November and over-winter in pools before spawning the next spring. Steelhead remain in the ocean for 1-3 years before returning to natal streams to spawn. Map 1 displays the range of steelhead in Idaho and the Roadless Areas.

Snake River Spring/Summer-run Chinook Salmon

Snake River spring/summer-run Chinook salmon historically were found spawning in the Snake River tributaries of the Clearwater, Salmon, Weiser, Payette and Boise rivers. Populations using the rivers above Hells Canyon Dam were eliminated with the construction of Hells Canyon complex from 1955 to 1967 and earlier upriver dams. Populations in the Clearwater drainage were eliminated or severely depressed by the Lewiston dam in the 1950s. The Idaho portion of the Snake River spring/summer-run Chinook salmon Evolutionary Significant Unit (ESU) consists of all the Salmon River drainage and the Snake River drainage upstream to Hells Canyon Dam. The Clearwater drainage was not included due to loss of this population in the 1950s. Although not listed in the ESU, the reestablished Clearwater River populations have been considered as part of the historical range. About 100 roadless areas in Idaho have habitat that supports spring/summer-run Chinook salmon.

Spring/summer-run Chinook salmon for the Snake and Salmon River sub-basins were listed as threatened under ESA in 1992 (USDC NOAA 1992a, see correction USDC NOAA 1992b); threatened status reaffirmed in 2005 (USDC NOAA 2005a). Map 2 displays the range of spring/summer-run Chinook salmon in Idaho and the Roadless Areas.

Chinook salmon are the largest of any salmon, with adults often exceeding 40-60 pounds after 3-5 years in the ocean. Spring/summer Chinook salmon use smaller, higher elevation tributary systems for spawning and juvenile rearing compared to fall-run Chinook salmon which spawn in mainstem larger rivers. As with most salmon, adults die after spawning providing a large nutrient source for juvenile fish. Juvenile spring/summer-run Chinook salmon remaining headwater streams for a year and out-migrate the following spring.

Snake River Fall-run Chinook Salmon

Historically, Snake River fall-run Chinook salmon spawned in the Snake River upriver to the Hagerman Valley and in lower portions of the Salmon and Clearwater Rivers. Populations using the river above Hells Canyon Dam were eliminated with the construction of the Hells Canyon complex from 1955 to 1967 and earlier upriver dams. The Idaho portion of the Snake River fall-run Chinook salmon Evolutionary Significant Unit (ESU) consists of the Clearwater drainage up to Lolo Creek except for the North Fork above Dworshak Dam, Salmon River drainage upstream to the Little Salmon River and the Snake River drainage upstream to Hells Canyon Dam. Fall-run Chinook salmon for the Snake and Salmon River sub-basins were listed as threatened under ESA in 1992 (USDC NOAA 1992a, see correction USDC NOAA 1992b); threatened status was reaffirmed in 2005 (USDC NOAA 2005). The John Day, North Fork Slate roadless area on the Nez Perce NF; Hells Canyon/7 Devils Scenic, Patrick Butte roadless areas on the Payette NF; and the Big Canyon ID, Klopton Creek-Corral Creek ID roadless areas on the Wallowa-Whitman NF have habitat supporting fall-run Chinook salmon. Map 3 displays the range of fall-run Chinook salmon in Idaho and the Roadless Areas.

Fall-run Chinook salmon use the mainstem of larger rivers to spawn compared to spring/summer-run Chinook salmon which spawn in smaller, higher tributary streams. Adult fall-run Chinook salmon enter the Snake River from late August through November. Fry emerge in March and juvenile fall-run Chinook salmon typically differ from spring/summer-run fish in that they begin a slow downstream migration as subyearlings soon after emerging from the gravel, feeding on their way to the ocean. Most complete the journey in the first year.

Bull Trout

Bull trout occur in the northwestern portion of North America from Nevada to the Yukon Territory (Behnke 2002). Due to concerns about declining population numbers of bull trout in some areas of their range and lack of information in other areas, the USFWS listed the species as threatened in 1998 in the Columbia River basin (USDI Fish and Wildlife Service 1998b). Idaho contains approximately 48% of the stream miles and 39% of the lakes and reservoirs for this species (Reighn, personal communication, June 15, 2007). Although Idaho contributes to a significant portion of the occupied habitat for bull trout, the populations in Idaho have declined severely (46%) within their historic range in the state. About 170 roadless areas in Idaho have habitat that supports bull trout. Map 4 displays the range of bull trout in Idaho and the Roadless Areas.

In Idaho, bull trout are currently found in the Boise, Payette, and Weiser drainages, and all the drainages to the north in the Columbia River basin. There is a small isolated population remaining in the Jarbridge drainage to the south of the Snake River and the Little Lost River. There are no Idaho Roadless Areas associated with the Jarbridge drainage.

Bull trout exhibit 3 life history types in Idaho: adfluvial, fluvial, and resident, all which require cold water temperatures <16^{o}C (<60^{o}F) during portions of their life cycle to persist. Bull trout generally prefer colder water temperatures <12^{o}C (<54^{o}F) than other trout species found in Idaho.

Sockeye Salmon

In Idaho, sockeye salmon historically spawned and reared in the large lakes accessible to the ocean (Payette and Salmon River drainages). The Payette Lake population was eliminated in the early 1990s due to dam construction on the Payette River. Currently sockeye salmon are only found in lakes in the Stanley basin of the upper Salmon River, primarily Redfish and Alturas Lakes. Sockeye salmon in the Snake River basin are an anadromous species which have life history patterns that depend on the fresh water lakes and access to the ocean. They migrate to and from the ocean through the Salmon, Snake, and Columbia Rivers.

Sockeye salmon spawn in gravel areas in lakes, where juveniles rear for 1 to 3 years prior to migrating to the ocean. Sockeye salmon in the Snake River drainage were listed as endangered under ESA in 1991 (USDC NOAA 1991). At the time of listing, the Snake River sockeye salmon ESU was limited to Redfish Lake but enhancement has increased distribution to Alturas and Petit Lakes. Roadless Areas that are located in the Redfish Lake, Alturas Lake and Pettit Lake basins include: Hanson Lakes (#915), Huckleberry (#016) and Pettit (#017). Map 5 displays the range of sockeye salmon in Idaho and the Roadless Areas.

Kootenai River White Sturgeon

The white sturgeon occurs in large rivers in the Pacific Northwest from central California to southwest Alaska. The Kootenai River population has been geographically isolated from other populations since the last ice age. The population ranges from Kootenay Lake in British Columbia up to the Kootenai River through Idaho to Kootenai Falls in Montana. The Kootenai River population was listed as endangered in 1994 (USDI Fish and Wildlife Service 1994). The white sturgeon is the largest freshwater fish in North America. The Katka Peak, Mt. Willard, Lake Estelle, and Selkirk Roadless Areas on the Idaho Panhandle National Forest overlap habitat for the Kootenai River white sturgeon. Map 6 displays the range of Kootenai white sturgeon in Idaho and the Roadless Areas.

T&E Fish Species Richness

The total number of aquatic threatened and endangered (T&E) fish species known to occur in each Idaho Roadless Area was used to characterize species richness within a roadless area. There are 170 roadless areas that are within the range for aquatic threatened and endangered species (Appendix A). Idaho Roadless Areas with the greatest overlap of threatened and endangered fish species are especially valuable for their species richness and contribution to biodiversity. Nine roadless areas overlap with four threatened and endangered species (Table 5); 88 roadless areas overlap with three aquatic species; 6 roadless areas overlap with two species; and 69 roadless areas overlap with one species. Map 7 shows Idaho Roadless Areas that overlap threatened and endangered aquatic species and species richness in these areas.

Table 5. Idaho Roadless Areas that provide habitat for multiple (four) threatened and endangered fish species

Idaho Roadless Area	Forest
Hanson Lakes	Boise/Challis/Sawtooth
John Day	Nez Perce
North Fork Slate Creek	Nez Perce
Hells Canyon/7 Devils Scenic	Payette
Patrick Butte	Payette
Huckleberry	Sawtooth
Pettit	Sawtooth
Big Canyon ID	Wallowa-Whitman
Klopton Creek – Corral Creek ID	Wallowa-Whitman

Critical Habitat

Critical habitat has been designated for all the threatened and endangered fish species. Snake River steelhead critical habitat was designated and mapped by NOAA Fisheries (USDC NOAA 2005b). NOAA Fisheries (Chamberlin, S. personal communication May 29, 2007) recommended using the NOAA steelhead distribution map for spring/summer-run and fall-run Chinook salmon critical habitat because the steelhead map also includes the current and historically accessible habitat for both these runs of Chinook salmon. Sockeye critical habitat is limited to Redfish Lake and the main stem Snake River (USDC NOAA 2005b). Kootenai River white sturgeon critical habitat was designated and mapped by the FWS (USDI Fish and Wildlife Service 2006). Critical habitat has been designated for bull trout (USDI Fish and Wildlife Service 2005); however, none is designated on NFS lands. Table 6 displays critical habitat for Idaho threatened and endangered fish species in Idaho Roadless Areas.

Table 6. Threatened and Endangered Fish Critical Habitat in Idaho Roadless Areas

Species	Acres of IRA providing critical habitat	Percent critical habitat in IRAs
Steelhead	3,433,000	28
Chinook	3,433,000	28
Bull trout	0	0
Sockeye	347,700	21
Kootenai River white sturgeon	7,000	7

Fish Strongholds

Most of Idaho is included in the Interior Columbia Basin which was the focus of a large-scale assessment, the Interior Columbia Basin Ecosystem Management Project (ICBEMP) (USDA and USDI 1997) and FEIS (USDA and USDI 2000b). As part of the ICBEMP assessment fish strongholds were identified for seven key native salmonids including: steelhead, Chinook spring/summer-run, Chinook fall-run, bull trout, redband trout, westslope cutthroat trout, and Yellowstone cutthroat trout (Lee et al. 1997). In Idaho, there are no strongholds for ocean type (fall-run) or stream type (spring/summer-run) Chinook. Strongholds identified in Idaho for the other five remaining salmonid species are used in this assessment of the Idaho Roadless Areas and Roadless Area management alternatives. ICBEMP salmonid strongholds are directly associated with strong populations which have the following characteristics:

1. All major life-history forms (for example: resident, fluvial, adfluvial) that historically occurred within the watershed are present;
2. Numbers are stable or increasing and the local population is likely to be at half or more of its historic size or density; and
3. The populations or metapopulation within the watershed, or within a larger region of which the watershed is a part, probably contains at least 5,000 individuals or 500 adults.

Both fish strongholds and priority watersheds are valuable for their contribution to conservation and recovery of species and their habitats. Even small areas can contribute significant value depending on their location and contribution to interconnecting populations, providing for a larger metapopulation, distance to a source population and contribution to genetic and phenotypic diversity. Analysis conducted for ICBEMP (Lee et al. 1997) indicates that strong fish populations are often associated with areas of low road density. That analysis showed that increasing road densities (miles of road per square mile) and their attendant effects were associated with declines in the status of bull trout, westslope cutthroat trout, Yellowstone cutthroat trout, and redband trout.

Acres of Idaho Roadless Areas contributing to ICEBMP fish strongholds by species are shown in Table 7.

Table 7: Idaho Roadless Area acres contibuting to fish strongholds

Fish Species	IRA acres contributing to fish strongholds
Bull trout	453,469
Redband trout	660,345
Steelhead	54,034
Yellowstone cutthroat trout	279,381
Westslope cutthroat trout	914,979

ICEBMP fish strongholds overlap 16 of the 250 Idaho Roadless Areas (Map 8), with many areas providing strongholds for multiple species (Table 8).

Table 8: Idaho Roadless Areas that provide larger stronghold areas and/or strongholds for multiple fish species

Forest	Idaho Roadless Area	Forest	Idaho Roadless Area
Boise	Deadwood	Clearwater	North Lochsa Slope
Boise	Peace Rock	Clearwater	Weir - Post Office Creek
Boise	Sheep Creek	Clearwater/ Idaho Panhandle	Mallard-Larkins
Boise	Ten Mile/Black Warrior	Clearwater/Idaho Panhandle	Meadow Creek - Upper North Fork
Boise/Challis	Red Mountain 916	Clearwater/Nez Perce	Rackliff - Gedney
Boise/Payette	Needles	Idaho Panhandle	Mt. Willard-Lake Estelle
Boise/Payette	Snowbank		
Boise/Sawtooth	Lime Creek	Nez Perce/Payette	Rapid River
Boise/Sawtooth	Smoky Mountains	Payette	Cottontail Point/Pilot Peak
Challis	Challis Creek	Payette	Cuddy Mountain
Challis	Seafoam	Payette	French Creek
Challis	Squaw Creek	Payette	Patrick Butte
Challis/Sawtooth	Boulder-White Clouds	Payette	Secesh
Challis/Sawtooth	Loon Creek	Salmon/Challis	Camas Creek
Clearwater	Bighorn - Weitas	Salmon/Challis	Lemhi Range
Clearwater	Hoodoo	Sawtooth	Buttercup Mountain
Clearwater	Lochsa Face		

PRIORITY WATERSHEDS

Priority watersheds (a.k.a. "special emphasis" or "key" watersheds) are areas which provide for high quality habitat and stable populations of listed fish species. Priority watersheds are a cornerstone of most species conservation strategies (Lee et al. 1997). Concern for the continued viability of salmonids on federally managed forest lands has led to establishment of the concept of "priority watersheds" in which high priority is given to protecting stream habitat (Reeves and Sedell 1992; USDA and USDI 1993). The goal of these watersheds is to maintain the best habitats and fish populations, and generally watersheds are chosen that have the highest potential for rehabilitation. This assessment of the Idaho Roadless Areas and Roadless Area management alternatives includes Chinook, steelhead and bull trout priority watersheds.

Of the Roadless Area in Idaho 57% contain priority watersheds identified for conservation of threatened and endangered fish species, including steelhead, spring-summer Chinook salmon, and bull trout. In Idaho, no priority watersheds are designated for fall-run Chinook. Table 9 displays acres and percent of priority watersheds in Idaho Roadless Areas by species.

Table 9: T & E Fish Priority Watersheds in Idaho Roadless Areas

Fish Species	Acres of priority watershed in IRAs	Percent of priority watersheds in IRAs
Steelhead	1,111,583	28%
Chinook	1,885,760	39%
Bull trout	7,996,472	43%

Several of the T&E fish priority watersheds contribute to species richness by providing habitat for several of the species. Of the Idaho Roadless Areas that contain priority watersheds, 15 provide priority watershed areas for all three species (steelhead trout, Chinook salmon, and bull trout) (Table 10). About 50 Idaho Roadless Areas are priority watersheds for two species. These roadless areas provide important habitat for multiple species and are of very high value to aquatic biodiversity, warranting management that will maintain their aquatic integrity.

Table 10: Idaho Roadless Areas that provide Threatened & Endangered Fish Priority Watershed Areas for all 3 Species: Steelhead Trout, Chinook Salmon and Bull Trout

Idaho Roadless Area	Forest
Challis Creek	Challis
Loon Creek	Challis/Sawtooth
Dixie Summit - Nut Hill	Nez Perce
East Meadow Creek	Nez Perce
John Day	Nez Perce
Little Slate Creek	Nez Perce
Little Slate Creek North	Nez Perce
Mallard	Nez Perce
North Fork Slate Creek	Nez Perce

Idaho Roadless Area	Forest
Salmon Face	Nez Perce
West Meadow Creek	Nez Perce
Rapid River	Nez Perce/Payette
Camas Creek	Salmon/Challis
Lemhi Range	Salmon/Challis
Taylor Mountain	Salmon/Challis

*Note: East Meadow Creek Idaho Roadless Area and West Meadow Creek Idaho Roadless Area function as a complex since they are located on either side of the Meadow Creek drainage. Both have equal influence on Meadow Creek aquatic resources.

Bull Trout Core Areas

Core areas for bull trout were identified throughout the range of the species by the U.S. Fish and Wildlife Service (USDI Fish and Wildlife Service 2005). A core area is a system of watersheds within larger basin. Each watershed is the habitat for a local population that interacts with other local populations throughout the larger basin. The system of core areas is intended to provide for the long-term persistence and the restoration and maintenance of ecological and metapopulation processes (USDA Forest Service 1996). Priority watersheds mentioned in the previous section fit within core areas. Similar to fish strongholds and priority watersheds, minimal ground disturbing management activities in these special areas is desirable.

In Idaho, primary factors suppressing bull trout habitat quality include forest management and grazing (USDA Forest Service 1996).

6,739,689 acres of bull trout core areas are within IRAs (Map 9). Twenty six percent of the bull trout core areas acres in Idaho are in Roadless Areas.

Forest Service Sensitive Species

Forest Service sensitive species are designated by the Regional Forester each Region. Region 1 updated their Regional Sensitive Species list in 2001. Region 4 last updated their list in 2003 (technical edits in 2004). Forest Service Sensitive Aquatic Species for Regions 1 and 4 are listed in Table 1 The National Forest Management Act of 1976 requires the Forest Service to "provide for a diversity of plant and animal communities" [16 U.S.C. 1604(g)(3)(B0] as part of our multiple use mandate. The Sensitive Species Program is intended to conserve species to prevent a trend toward listing under the Endangered Species Act of 1973. Forest Service sensitive species are given special management consideration to ensure their continued contribution to diversity and ecological sustainability on the National Forests. Species on the sensitive species list for a Region are considered sensitive for every forest where they occur in that Region. Regional aquatic sensitive species including fish and amphibians were used in this assessment of the Idaho Roadless Areas and Roadless Area management alternatives.

Forest Service aquatic sensitive species within the analysis area includes both fish and amphibians. All of the Forest Service aquatic sensitive species have some overlap with

Idaho Roadless Areas (Table 11). Some of these species have very limited distributions (e.g. Wood River sculpin, Coeur d'Alene salamander), and because of their limited distribution smaller areas can be significant to the continued support of the population size and distribution.

Table 11: Percent of Forest Service Sensitive Species Range in Idaho that Overlaps with Idaho Roadless Areas

Sensitive Species (FS Region)	Percent of species range that overlaps Idaho IRAs
FISH	
Bonneville cutthroat trout (R4)	23%
Burbot (R1)	12%
Inland redband trout (R1)	21%
Pacific lamprey (R1)	19%
Chinook salmon (naturalized populations) (R1)	18%
Fine-spotted Snake River cuttroat trout [Yellowstone cutthroat trout] (R4)	23%
Westslope cutthroat trout (R1 & R4)	28%
Wood River sculpin (R4)	25%
AMPHIBIANS	Percent of species predicted habitat that overlaps Idaho IRAs
Coeur d'Alene salamander (R1)	27%
Columbia spotted frog (R4)	20%
Western toad (R1)	90%

**R1=Northern Region, R4=Intermountain Region*

Forest Service Sensitive Species Richness

To characterize sensitive species richness we used the total number of aquatic sensitive species known to occur in each Idaho Roadless Area. There are 249 Idaho Roadless Areas that are within the range for aquatic sensitive species (Appendix B). Several roadless areas are within the range of several sensitive species. The 50 IRAs supporting five or more sensitive aquatic species are displayed in Table 12. Areas of multiple species overlap are important for species conservation and biodiversity. Map 10 displays aquatic sensitive species richness within the Idaho Roadless Areas.

Table 12. Idaho Roadless Areas with multiple (5+) sensitive aquatic species (amphibians and fish)

Forest	Idaho Roadless Area	Forest	Idaho Roadless Area
Boise/Sawtooth	Smoky Mountains	Idaho Panhandle	Selkirk
Challis/Sawtooth	Boulder-White Clouds	Idaho Panhandle	White Mountain
Clearwater	Bighorn – Weitas*	Nez Perce	Gospel Hump
Clearwater	Eldorado Creek	Nez Perce	Gospel Hump Adjacent to Wilderness
Clearwater	Hoodoo	Nez Perce	John Day
Clearwater	Lochsa Face*	Nez Perce	Clear Creek
Clearwater	Lolo Creek (LNF)	Nez Perce	Dixie Summit - Nut Hill
Clearwater	North Fork Spruce - White Sand	Nez Perce	East Meadow Creek

Forest	Idaho Roadless Area	Forest	Idaho Roadless Area
Clearwater	North Lochsa Slope*	Nez Perce	Lick Point
Clearwater	Sneakfoot Meadows	Nez Perce	Mallard
Clearwater	Weir - Post Office Creek*	Nez Perce	North Fork Slate Creek
Clearwater	Moose Mountain	Nez Perce	O'Hara - Falls Creek*
Clearwater	Pot Mountain	Nez Perce	Silver Creek - Pilot Knob*
Clearwater	Rawhide	Nez Perce	West Fork Crooked River -NEW
Clearwater	Siwash	Nez Perce	West Meadow Creek*
Clearwater/Idaho Panhandle	Mallard-Larkins	Payette	Cottontail Point/Pilot Peak
Clearwater/Idaho Panhandle	Meadow Creek - Upper North Fork	Payette	Patrick Butte
Clearwater/Nez Perce	Rackliff – Gedney*	Salmon	Duck Peak
Idaho Panhandle	Blacktail Mountain #161	Salmon	Haystack Mountain
Idaho Panhandle	Grandmother Mountain	Salmon	Long Tom
Idaho Panhandle	Katka Peak	Salmon	Napias
Idaho Panhandle	Kootenai Peak	Salmon	Napoleon Ridge
Idaho Panhandle	Mt. Willard-Lake Estelle	Salmon	Sheepeater
Idaho Panhandle	Saddle Mountain	Wallowa-Whitman	Klopton Creek - Corral Creek Id
Idaho Panhandle	Schafer Peak		

MANAGEMENT INDICATOR SPECIES

Management Indicator Species (MIS) are identified by the individual Forests during the development of the Forest Plan under the 1982 Planning Rule. All of the Idaho Forest aquatic MIS species, except one, are already included in the list of TES species for this assessment (Table 13). The only species not included is rainbow trout which was identified by the Idaho Panhandle National Forest as a MIS (1987). This Idaho Roadless Area assessment includes rainbow trout for the Idaho Panhandle National Forest.

Table 13: Aquatic Management Indicator Species with Ranges Overlapping Idaho National Forest Inventoried Roadless Areas

Aquatic MIS Species	Boise	Caribou	Challis	Clearwater	Idaho Panhandle	Nez Perce	Payette	Salmon	Sawtooth	Targhee
Bonneville cutthroat trout		X								
Bull trout	X		X				X	X	X	
Chinook salmon				X		X				
Cutthroat trout					X	X				
Rainbow trout					**X**					
Snake River cutthroat trout										X

Aquatic MIS Species	Boise	Caribou	Challis	Clearwater	Idaho Panhandle	Nez Perce	Payette	Salmon	Sawtooth	Targhee
Steelhead trout				X		X				
Westslope cutthroat trout				X						
Yellowstone cutthroat trout										X
Spotted frog										X

Bolded Species *= Management indicator species that are NOT threatened, endangered or sensitive species*
Italics =Management Indicator Species that are threatened, endangered or sensitive species

Map 11 displays rainbow trout distribution on the Idaho Panhandle National Forest. Note that this species is an MIS on the Idaho Panhandle National Forest only. The Range of rainbow trout overlaps with 600,881 acres of Idaho Roadless Areas on the Idaho Panhandle National Forest. This overlap equals about twenty eight percent of the total range for rainbow trout on the Idaho Panhandle National Forest.

Aquatic Animal Habitat and Species: Effects

The Results write-up is organized in to two sections. Section I includes a discussion of the influences of selected management activities on aquatic animal habitat and species. Section II is an evaluation of the three alternatives.

I. Influences of Selected Management Activities on Aquatic Animal Habitats and Species

Roads

Road construction/reconstruction, maintenance, use, and even the presence of roads in a watershed, can have numerous adverse effects to aquatic ecosystems and the species they support. Roads tend to be a ‘press’ disturbance which is longer in duration than a ‘pulse’ disturbance and are generally associated with habitat alteration (Allan and Flecker 1993, Niemi et al. 1990, Yount and Niemi 1990). Watershed and aquatic habitat recovery tends to be more rapid from pulse than from press disturbances (Allan and Flecker 1993). Gurtz and Wallace (1984) hypothesized that stream biota may not be able to recover from the effects of anthropogenic disturbances, such as roads or timber harvest, because that have no analogues in the natural disturbance regime, and organisms may not have evolved the appropriate breadth of habitat or reproductive requirements. Recent changes in road designs and application of best management practices have been effective in some instances at moderating or avoiding many adverse effects. The discussion in this section captures the principal effects that have been associated with roads, but these are potential effects, and not every road would necessarily exhibit each or even many of these effects. Also, the effects of roads may vary with physical and biological conditions and the physical location of the road (Luce et al. 2001). The Physical Resources section provides a full discussion of potential geomorphic and hydrologic effects of roads on watershed and stream channel conditions.

Potential effects from roads include (Furniss et al. 1991, USDA Forest Service 2000c):

- Increasing sediment loads in streams,
- Modifying watershed hydrology and stream flows,
- Altering stream channel morphology,
- Increasing habitat fragmentation and loss of connectivity,
- Degrading water quality, including increasing chance of chemical pollution, and
- Altering water temperature regimes.

These physical alterations can potentially result in a variety of adverse effects to aquatic species including:

- Increased mortality of amphibians, from crushing,
- Loss of spawning and rearing habitat, and deep pools, from excess sediment deposition,
- Increased mortality of eggs and young from lower levels of oxygen in stream gravels,
- Increased susceptibility to disease and predation,
- Increased reproductive failure,
- Shifts in macro invertebrate communities to those tolerating increased sediment or other types of diminished water quality,
- Increased susceptibility to over harvest and poaching,
- Loss of protective cover and resting habitat through changes in channel structure including large woody debris, overhanging banks, and deep pools,
- Competition from nonnative species,
- Loss of habitat caused by habitat degradation, barriers to passage, increased gradient, high temperatures, and other factors, and
- Increased vulnerability of subpopulations to catastrophic events and loss of genetic fitness, related to loss of habitat connectivity.

Trombulak and Frissell (2000) concluded that, although all species and ecosystems are not affected to the same degree by roads, in general, the presence of roads in an area is associated with negative effects for both terrestrial and aquatic ecosystems including changes in species composition and population size. While the localized effect of an individual road-stream crossing may not have a substantial adverse effect, the cumulative effect of road networks and multiple crossings increases the potential for major adverse effects to aquatic habitats (USDA Forest Service 2000c).

Analysis done for the Interior Columbia Basin Ecosystem Management Project (Lee et al. 1997) indicates that strong fish populations are often associated with low road density. The Sierra Nevada Ecosystem Project documented a negative correlation between the abundance of roads in a watershed and the integrity of native stream biota (Moyle and Randall 1996).

The U.S. Fish and Wildlife Service (USDI Fish and Wildlife Service 1998a) found that bull trout are exceptionally sensitive to the direct, indirect, and cumulative effects of roads. Dunham and Rieman (1999) demonstrated that disturbance from roads was associated with reduced bull trout occurrence. They concluded that conservation of bull trout should involve protection of larger, less fragmented, and less disturbed (lower road density) habitats to maintain important strongholds and sources for naturally recolonizing areas where populations have been lost.

Road construction and timber harvest were identified as important factors in the regional decline and loss of populations of some inland cutthroat trout subspecies (Duff 1996, Young 1995). Adverse effects related to roads were identified for Colorado River, westslope, Bonneville, and Yellowstone cutthroat.

The biological opinion issued by the National Marine Fisheries Service for PACFISH (USDA and USDI 1995b) identified roads as a primary cause of salmonid decline, and indicated that roads may have unavoidable effects on streams, regardless of how well they are located, designed, or maintained. In discussing the effects of management activities in inventoried roadless areas in the Pacific Northwest, the ecosystem management assessment team headed by Jack Ward Thomas (USDA et al. 1993) concluded that such activities would increase the risk of damage to aquatic and riparian habitat and could potentially reduce the capacity and capability of key watersheds important for maintaining salmonid populations.

Roads contribute more sediment to streams than any other land management activity (Gibbons and Salo 1973, Meehan 1991), and most land management activities, such as mining, timber harvest, grazing, recreation and water diversions are dependent on roads. The majority of sediment from timber harvest activities is related to roads and road construction (Chamberlin et al. 1991, Dunne and Leopold 1978, Furniss et al. 1991, MacDonald and Ritland 1989, Megahan et al. 1978) and associated increased erosion rates (Beschta 1978, Gardner 1979, Meehan 1991, Reid 1993, Reid and Dunne 1984, Swanson and Dyrness 1975, Swanston and Swanson 1976). Serious degradation of fish habitat can result form poorly planned, designed, located, constructed, or maintained roads (Furniss et al. 1991, MacDonald et al. 1991).

Roads directly affect natural sediment and hydrologic regimes by altering streamflow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, stream temperatures, water quality, and riparian conditions within a watershed (Jones et al. 2000, Lee et al. 1997, Luce et al. 2001). Road-related mass soil movements can continue for decades after the roads have been constructed (Furniss et al. 1991). Megahan et al. (1992) found that 88% of landslides within Idaho were associated with roads. Such habitat alternations can adversely affect all life-stages of fishes, including migration, spawning, incubation, emergence, and rearing (Furniss et al. 1991, Henjum et al. 1994, MacDonald et al. 1991).

Road/stream crossings can also be a major source of sediment to streams resulting from channel fill around culvets and subsequent road crossing failures (Furniss et al. 1991). Plugged culverts and fill slope failures are frequent and often lead to catastrophic increases in stream channel sediment, especially on old abandoned or unmaintained roads (Weaver et al. 1987). Unnatural channel widths, slope, and stream bed form occur upstream and downstream of stream crossings (Heede 1980), and these alterations in channel morphology may persist for long periods of time. Because improper culverts can reduce to eliminate fish passage (Belford and Gould 1989), road crossings are a common migration barrier to fishes (Clancy and Reichmuth 1990, Clarkin et al. 2003, Evans and Johnson 1980).

Temporary roads present most of the same risks posed by permanent roads, although some may be of shorter duration. Many of these roads are designed to lower standards than permanent roads, are typically not maintained to the same standards, and are associated with additional ground disturbance during their removal. Also, use of temporary roads in a watershed to support timber harvest or other activities often involves construction of multiple roads over time, providing a more continuous disturbance to the watershed than a single, well-designed, maintained, and use-regulated road. While temporary roads may be used temporarily, for periods ranging up to 10 years before decommissioning, their short- and long-term effects on aquatic species and habitats can be extensive.

Idaho's Strategic Action Plan for invasive species (Idaho Invasive Species Council 2005) recognizes the problem invasive species pose to Idaho and the need to prevent the entry and spread of unwanted species in the state. Roads can provide dispersal of invasive species by: 1) providing habitat by altering conditions, 2) making invasion more likely by stressing or removing native species, and 3) allowing easier movement by wild or human vectors (Trombulak and Frissell 2000). Introductions of nonnative fishes and other aquatic species, whether authorized or unauthorized, have the potential to affect the distribution and abundance of native fishes, amphibians, and other aquatic organisms through competition, hybridization, predation, and introduction of parasites and diseases. Nonnative aquatic plants may also be inadvertently introduced to lakes and streams from boats and boat trailers. Unauthorized releases of aquarium fishes, bait fishes, nonnative amphibians and reptiles, and nonnative plants to streams and lakes are strongly influenced by the presence of roads (Allan and Flecker 1993, Lee et al. 1997; USDA Forest Service 1999). Illegal introduction and harvest of aquatic species is less likely to occur in inventoried roadless areas due to lack of ready access.

Roads facilitate increased use of an area by humans, who themselves often cause diverse and persistent ecological effects (Trumbulak and Frissell 2000). New roads increase ease of access into formally remote areas. Perhaps more important, roads often increase the efficiency with which natural resources can be exported. Human uses of the landscape made increasingly possible by roads include hunting and fishing, recreation, and changes in use of the land and water (Trumbulak and Frissell 2000). Native fish populations in previously inaccessible areas are often vulnerable to even small increases in fishing effort (Trumbulak and Frissell 2000). Some amphibians, especially western toads, use roads for travel routes and are susceptible to crushing by vehicles on roads (Maxell 2000).

In considering the contributions of large unroaded areas for conservation of aquatic habitats and species, comparisons can be drawn from research in other areas lacking roads and with minimal levels of human disturbance. For example, in evaluating the role of Wilderness Areas in conserving aquatic biological integrity in Western Montana, Hitt and Frissell (1999) concluded that, although the presence of designated Wilderness does not guarantee aquatic biological integrity due to factors such as fish stocking practices and impacts from adjacent roads, “the importance of Wilderness in aquatic conservation is extraordinary.” Their analysis showed that more than 65% of waters that were rated as having high aquatic biological integrity were found within subwatersheds containing Wilderness. They also concluded that, given the relative rarity of unprotected areas that support a relatively greater degree of aquatic biological integrity, undisturbed areas warrant permanent protection. Reeves et al. (1995) suggest reserves on the scale of watersheds are needed for anadromous salmonid conservation and that reserves with good habitat conditions and functionally intact ecosystems are likely to be found in wilderness and roadless areas on federal lands.

The broad view of the ecological effects of roads reveals a multiplicity of effects, it also suggests that it is unlikely that the consequences of roads will ever be completely mitigated or remediated (Trumbulak and Frissell 2000). Thus it is critical to retain remaining roadless or near-roadless portions of the landscape in their natural state (Trumbulak and Frissell 2000).

Timber Cutting

The effects of activities associated with timber cutting (e.g., tree felling, yarding, landings, site preparation by burning or scarification, fuels reduction, brush removal and whip felling, and forest regeneration) are often difficult to separate from the effects of roads and road construction. The road systems developed to cut/harvest timber are often a significant factor affecting aquatic habitats, as discussed above. Negative effects from timber cutting tend to increase when activities occur on environmentally sensitive terrain with steep slopes comprised of highly erodible soils (Lee et al. 1997). Some of the potential effects to aquatic habitat from timber harvest can include the following (Beschta et al. 1987, Chamberlin et al. 1991, Hicks et al. 1991):

- Increasing erosion,
- Increasing sediment supply and storage in channels,
- Modifying watershed hydrology and streamflow, including the timing or magnitude of runoff events,
- Decreasing stream bank stability, and altering stream channel morphology,
- Changes in water quality and quantity,
- Decreased recruitment of large woody debris to aquatic habitats,
- Diminishing habitat complexity,

- Altering energy relationships involving water temperature, snowmelt and freezing, and
- Altering riparian composition and function.

If present, these physical changes in habitat would have may of the same biological effects as previously listed under the effects of roads, above. With the recent increased emphasis on use of best management practices and other protective measures in the design and implementation of timber harvest activities, the effects can often be mitigated to some extent. Cumulatively, however, timber harvest activities within a watershed can have pronounced and lasting effects to aquatic habitat (Chamberlin et al. 1991).

Discretionary Mining

Idaho Roadless Areas contain salable, leasable, and locatable mineral resources. Discretionary mining includes activities associated with saleable minerals (i.e. sand, stone, gravel, pumice, pumicite, cinders and clay) and leasable minerals (i.e. oil, oil shale, gas, coal, phosphate, potassium, sodium, sulphur, gilsonite, geothermal resources and hardrock minerals). Locatable minerals, such as gold and silver, are subject to the General Mining Law of 1872 and are not discretionary. The proposed Idaho Roadless Area management alternatives do not seek to impose limits regarding activities undertaken regarding locatable minerals and therefore will not be discussed further in this document. Mining for these materials occurs as surface mining or underground mining. Although any mining activity may have negative effects on aquatic ecosystems, the largest impacts have generally been associated with surface mining (Lee et al. 1997).

Mining activities can affect aquatic ecosystems in a number of ways; through the addition of large quantities of sediments, the addition of solutions contaminated with metal or acids, the acceleration of erosion, increased bank and streambed instability, changes in channel formation and stability, and removal of riparian vegetation (Lee et al. 1997).

In general, surface mining causes higher stream flows and greater storm flow volumes than underground mining due to a greater amount of surface area disturbance with associated removal of vegetation and topsoil, greater amounts of spoils, and general compaction of the area (Southern Appalachian Man and the Biosphere 1996c). While stream channels can adjust to increased flows and sediment loads, such alterations can have adverse effects on the quality of aquatic habitat.

Sediments can enter streams through erosion of mine tailings (Besser and Rabeni 1987), by direct discharge of mining wastes to aquatic systems, and through movement of groundwater (Davies-Colley et al. 1992). Coarse sediments delivered to channels are likely to be deposited relatively quickly, affecting nearby aquatic habitat. Finer materials settle out more slowly and may create turbid water conditions for long distances downstream, affecting primary production and biomass by reducing the amount of light available to algae and rooted aquatic plants (Lee et al. 1997). Increases in turbidity can cause direct mortality to aquatic species, reduce growth and feeding activity (Nelson et al. 1991), and can affect the abundance and diversity of benthic invertebrates (Lee et al. 1997). Excessive fine sediment deposition in stream substrates can degrade spawning habitat for salmonids, and eliminate habitat for some bottom dwelling aquatic species by filling in spaces in gravels (Nelson et al. 1991).

Often mining operations need road access involving road construction and reconstruction. Ground disturbance, such as road and equipment pad construction, associated with mining activities can result in adverse impacts to aquatic habitats and species (Meehan 1991).

Of particular concern to aquatic resources in Idaho is selenium contamination resulting from phosphate mining. Selenium contamination has occurred world-wide in association with common and economically important activities such as fossil fuel processing, mining, and irrigation, resulting in dozens of cases in which fish and wildlife populations have been affected (Van Kirk and Hill 2006). The southeast Idaho phosphate mining region, with includes the Caribou National Forest, is one of the most extensive and productive phosphate fields in the world (Jasinski et al. 2004). The bioaccumulative nature of selenium in aquatic systems is well documented (Dobbs et al. 1996, Garcia- Hamilton 2002, Hernandez et al. 2000, Maier et al. 1998, Presser et al. 1994). Documented individual-level effects of selenium in fish include decreased egg incubation period, hatch rate, pre-swim-up fry survival, post-swim-up fry survival, juvenile winter survival, juvenile growth, adult survival, and adult growth (Van Kirk and Hill 2006). Modeling results from Van Kirk and Hill (2006) concluded that decreased juvenile survival in cutthroat trout due to selenium toxicity could result in decreased population size.

Extent and Duration of Effects

For aquatic habitats, the indirect effects of disturbances associated with road construction and timber harvest could extend well beyond those areas directly impacted, given the influence that upslope areas and upstream reaches have on the condition of downstream habitat (Chamberlin et al. 1991). The types and extent of impacts on aquatic habitats would depend on road location and design, proximity to accessible habitat, mitigation measures applied, and the activities enabled. For fish populations, habitat alterations can adversely affect all life-stages, from egg to adult, and habitat essential for migration, spawning, incubation, emergence, rearing, feeding, and security (Furniss et al. 1991).

The duration of effects, or recovery time, is dependent on a variety of factors. Site productivity, rainfall, and length of growing season influence the rate and success of vegetation regrowth. The type, location, extent and duration of an activity, magnitude of adverse effects, dominant hydrologic and geomorphic processes within the watershed, overall watershed condition, and the effectiveness of mitigation and reclamation activities are some of the other factors influencing the duration of physical effects on a watershed and associated stream channels. The duration of biological effects can extend beyond the recovery time for the physical environment, and can be irreversible if a species is extirpated from the watershed.

II. DISCUSSION OF THE ALTERNATIVES

Background

1. 2001 Roadless Rule Alternative. This alternative represents an inventoried roadless area management regime guided by the direction provided in the 2001 Roadless Rule (2001 Rule).
2. Existing Plans Alternative. This alternative represents an inventoried roadless area management regime guided by each forest's land and resource management plan as they would be implemented without the 2001 Roadless Rule.
3. Idaho Roadless Rule Alternative. This alternative represents an inventoried roadless area management regime guided by the direction provided in the Idaho Governor Risch petition to the United States Secretary of Agriculture (State of Idaho 2006).

In general, land management activities in inventoried roadless areas often cost more to plan and implement than on other National Forest System lands (USDA Forest Service 2001). Typically these areas are more difficult to access or have not been the focus of past management and therefore have retained their roadless character. It is unlikely that Idaho Roadless Areas will be the focus of future land management activities that involve road construction, road reconstruction, or timber cutting. The possible exceptions to this are areas that have a high priority for fuels treatment, and areas with leasable mineral resources, such as phosphate and geothermal. Past and projected future land management activities in the Idaho Roadless Areas is very low, this is reflected in the projected low amounts of permanent and temporary road construction and timber cutting for the alternatives.

PACFISH (USDA and USDI 1995b) and INFISH (USDA and USDI 1995a) standards and guidelines that were designed to protect native fish species apply to all activities in the Columbia Basin under all the proposed alternatives.

None of the alternatives would prohibit road construction or reconstruction associated with developing existing mineral leases. Consequently, the 1100 acres of reasonably foreseeable road construction and mining disturbance associated with developing existing leases at the proposed Smoky Canyon mine expansion is expected to occur within Sage Creek and Meade Peak roadless areas under each of the alternatives. Sage Creek Idaho Roadless Area is within the range of the Snake River fine spot cutthroat and Meade Peak Idaho Roadless Area is within the range of the Snake River fine spot cutthroat and Bonneville cutthroat trout. Both the Sage Creek and Meade Peak Roadless Areas are considered strongholds for Yellowstone cutthroat trout. An additional 7,000 acres under existing lease, within the Dry Ridge, Huckleberry Basin, Meade Peak, Sage Creek, Schmid Peak, Stump Creek, and Mount Jefferson Roadless Areas could also be developed sometime in the future (50 or more years).

It is important to fully understand and consider the direction proposed by the three alternatives and how that direction relates to the management of inventoried roadless areas. The analysis of alternatives discusses known effects, as well as effects that are reasonably foreseeable. The three alternatives have subtle differences and are confounded by a variety of themes and potential outcomes if implemented given various funding scenarios and future resource demands. Unlike most Forest Service project analyses of alternatives and environmental consequences, the analysis of the Idaho Roadless Area management alternatives does not include an analysis of project implementation and resulting direct effects, it is an analysis of implementing a rule and the indirect and cumulative effects that could occur from actions that might occur under that rule. It is an analysis of what is allowed under the rule versus an analysis of on-the-ground activities, and therefore has no direct effects. The time frame for this Idaho Roadless Area effects analysis is 15 years.

Table 14. Acres by Theme, Existing Plans and the Idaho Roadless Rule overlapping important TES habitat

	Wild Land Recreation	Primitive	Backcountry Restoration	GFRG	Forest plan special areas[1]	SAHTS
Acres by allocation						
Existing plans	1,320,800	2,131,400	4,244,500	1,262,400	345,100	0
Idaho Roadless Rule	1,378,600	1,656,300	5,246,100	609,500	345,100	68,600
Acres in Idaho Roadless Areas overlapping 4 threatened and endangered species						
Existing Plans	28,700	60,300	126,700	14,900	17,700	0
Idaho Roadless Rule	28,700	60,300	141,600	0	17,700	0
Acres in Idaho Roadless Areas overlapping priority watersheds for 3 species						
Existing Plans	0	126,200	700,600	154,500	15,400	0
Idaho Roadless Rule	0	164,700	770,700	0	15,400	0
Acres in Idaho Roadless Areas overlapping large strongholds or strongholds for multiple fish species						
Existing Plans	813,500	1,121,200	1,945,500	132,000	151,600	0
Idaho Roadless Rule	858,700	1,053,600	2,343,500	5,400	151,600	46,700

[1] *Management direction under the Idaho Roadless Rule would not apply to forest plan special areas such as research natural areas, wild and scenic rivers, developed sites, etc.*

2001 Roadless Rule Alternative

The 2001 Roadless Rule provides the same permissions and prohibitions for all Idaho Roadless Areas. The purpose of the 2001 Rule was to ensure that inventoried roadless areas sustain their values for this and future generations. These values include: high quality or undisturbed soil, water and air, sources of public drinking water, diversity of plant and animal communities, habitat for threatened, endangered, proposed, candidate, and sensitive species for those species dependent on large undisturbed areas of land, primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation, reference landscapes (areas that are relatively undisturbed), natural appearing landscapes with high scenic quality, and traditional cultural properties and sacred areas, and other locally identified unique characteristics (e.g. geological formations) (USDA Forest Service 2001).

Management under the 2001 Rule would be very similar to the Primitive Theme presented in the Idaho Roadless Rule Alternative (Table 14). However, the Roadless Rule is slightly more permissive than the Idaho Roadless Rule Primitive Theme because it allows road construction under seven exemptions, only one of these exemptions (#3) applies to the Idaho Roadless Rule Primitive Theme.

The 2001 Roadless Rule prohibits road construction and reconstruction in inventoried roadless areas except for reasons other than timber cutting. There are seven exceptions that permit road construction and reconstruction (see Chapter 2 for a detailed description of the alternatives). The projected yearly average for road construction and reconstruction in Idaho Roadless Areas under this alternative is 1 mile. This projected estimate is for road miles constructed (permanent and temporary) for activities permitted by the 2001 Rule under the 7 exceptions. This estimate is based on information provided from the forests in relation to previous levels of activities in the Idaho Roadless Areas over the past 6 years and information projected forward over 5 years. There would be no roads constructed related to timber cutting. Fish strongholds, priority watersheds, and bull trout core areas would be benefited by the low amount of road construction/reconstruction under this alternative.

The 2001 Roadless Rule prohibits timber cutting, sale, or removal except as provided in four exceptions. Projected timber volume under this alternative is 0.5 MMBF per year over approximately 100 acres which would be the result of timber cutting for stewardship and not commercial product. This estimate is based on information provided from the forests in relation to previous levels of activities in the Idaho Roadless Areas over the past 6 years and information projected forward over 5 years. Mechanical vegetation manipulation to reduce fuel loading may be desirable in some areas where there is an abnormally high risk of high intensity, large-scale fires. With the added prohibition against non-stewardship timber cutting, this alternative presents a very low risk to aquatic resources from degradation or loss of aquatic habitat quality, quantity, and distribution resulting from timber cutting.

The 2001 Roadless Rule does not address mineral resources except to limit road construction and reconstruction to reserved or outstanding rights, or as provided for by statute or treaty; or for the continuation, extension, or renewal of a mineral lease. Proposals for exploration or development of leasable minerals using existing roads or not requiring use of roads would be allowed within inventoried roadless areas. The prohibition of road construction or reconstruction severely limits the opportunity for exploration and essentially precludes development of presently undiscovered leasable mineral resources in Idaho Roadless Areas. Under this alternative, there would be no new road construction/reconstruction within Idaho Roadless Areas on the 13,400 unleased acres within known phosphate lease areas on the Caribou-Targee National Forest. Without the ability to construct or reconstruct roads, there would be no exploration activity on these lands and it is likely that new leases would not be issued and the phosphate reserves on this acreage would not be mined.

By restricting timber harvest to activities necessary for resource stewardship and prohibiting new road construction (in most cases), many of the adverse effects of timber harvest would be minimized, while maintaining a management tool potentially needed for ecological restoration. Fuels reduction stewardship activities within a watershed may be indirectly beneficial to some aquatic populations. For example, careful thinning to reduce fuel loading in some areas where there is an abnormally high risk of high intensity, large-scale fires, may lower the risk of extirpation of an isolated fish population from a wildfire, particularly where habitat complexity and spatial diversity have already been diminished, and where recolonization would not be possible due to lack of habitat connectivity.

It is likely that fuel reduction activities in most inventoried roadless areas would not receive a strong emphasis. The priorities for fuels treatments would likely remain in areas where there is a risk to life and property. With the possible exception of some local site-specific examples, the prohibitions on road construction, road reconstruction and most timber harvest activities are not likely to affect the overall amount or severity of wildfires. As a result, the effects of wildfires on aquatic species are likely to be similar with or without the prohibitions. Whereas the benefits of less ground disturbance from road construction and timber harvest are well documented in the literature, it is less clear whether failure to reduce fuel loading would constitute a substantially increased level of risk, for either terrestrial or aquatic communities.

Aquatic habitat management activities that are not dependent on new or reconstructed road access could be implemented under this alternative. Overall, the need for additional road access to manage aquatic habitat within inventoried roadless area appears to be minimal. This alternative would not measurably affect the current ability of the Agency to manage aquatic habitat. In general aquatic habitats and species would benefit from the prohibitive nature of this alternative. All Idaho Roadless Areas would be managed under a similar set of guidelines that are fairly restrictive in relation to road construction/reconstruction, timber cutting and discretionary minerals activities.

Summary of Effects –

No adverse environmental effects to aquatic animal species or their habitat would be expected from this alternative, since it does not directly authorize any ground disturbing activities. Ground disturbing activities allowed under this alternative include very limited road construction/reconstruction and very limited timber cutting across the entire 9.3 million acres of Idaho Roadless Areas. Overall, the effects on biodiversity would be beneficial.

T&E species determination for the 2001 Roadless Rule Alternative –

> As previously determined during consultation on the 2001 Roadless Rule, this alternative may affect, but is not likely to adversely affect T&E species or adversely modify designated critical habitat. Furthermore, the 2001 Roadless Rule Alternative may beneficially affect T&E species and critical habitat.

Sensitive species determination for the 2001 Roadless Rule Alternative –

> May affect individuals, but is not likely to cause a trend towards Federal listing or a loss of viability for any sensitive species. Furthermore, the 2001 Roadless Rule Alternative may beneficially affect sensitive species and their habitat.

MIS species under the 2001 Roadless Rule Alternative –

> No adverse affect to MIS on any of the National Forests within the analysis area. Furthermore, the 2001 Roadless Rule Alternative may beneficially affect MIS and their habitat.

Existing Plans Alternative

The Existing Plans Alternative would have the greatest potential for aquatic habitat loss and disturbance associated with roads, timber cutting, discretionary mining, and other activities. Approximately 59% of the 9.3 million acres of inventoried roadless areas are included in land-management plan prescriptions that would allow road construction, road reconstruction, and timber harvest (includes acres listed under the Backcountry/Restoration and General Forest, Rangeland, Grassland themes) (Table.14). This alternative has the greatest acres designated to General Forest, Rangeland, Grassland (GFRG) approximately 1.3 million acres (Table 14) which is the most permissive of the themes. Projected road construction and reconstruction in Idaho Roadless Areas under this alternative is 14 miles per year. This estimate includes both permanent and temporary roads for timber cutting and non-timber related activities. The projected timber harvest offer of 16 MMBF is estimated to occur annually on 3,200 acres. These activities could reduce the quality and quantity of fish habitat in some roadless areas, with increased potential for adverse effects on some threatened, endangered or sensitive (TES) species. However, all activities would be done under the management direction of Existing Plans, most of which provide specific guidance (such as PACFISH and INFISH) to reduce adverse effects to TES species.

Table 14 displays the total acres of Idaho Roadless Areas within the themes and overlapping four threatened and endangered species, priority watersheds for three species, or large strongholds or strongholds for multiple fish species. Most of the acres of these indicators fall in the management prescription similar to the Backcountry/Restoration theme which is a moderately permissive theme.

Management of leasable mineral resources in Idaho Roadless Areas would be guided by each forest's land and resource management plan. There are 13,400 acres of known unleased phosphate deposits on the Caribou-Targhee National Forest. The Caribou

Forest Plan permits leasing of the estimated 6,500 acres of known unleased phosphate deposits and/or other possible roadless areas that contain undiscovered phosphate resources. The known unleased phosphate deposits occur in six roadless areas (Dry Ridge, Huckleberry Basin, Meade Peak, Sage Creek, Schmid Peak, and Stump Creek) and would likely be developed over an extended period of time (50 or more years). In addition, there are 6,900 acres of unleased phosphate deposits on the Targhee portion of the forest within the Bald Mountain, Bear Creek, and Poker Creek roadless areas. An environmental analysis would have to be completed to determine how much of the 6,900 acres could actually be leased. In the long-term it is reasonable to assume that many of the 13,400 known unleased phosphate deposit within Idaho Roadless Areas that contain mineral reserves would eventually be leased. If this were to occur, roads, pits, and other surface mining facilities would be expected to be constructed within the Idaho Roadless Areas.

No threatened or endangered aquatic species occur in the unleased known phosphate lease roadless areas. Bonneville cutthroat trout, an R4 sensitive species, and several sensitive amphibians are located in some of these roadless areas. There is a potential risk to sensitive aquatic species and their habitats on these 13,400 acres when and if this development should occur. Site-specific analysis would occur prior to any future leasing and mitigations applied.

Existing Plans would allow road construction/reconstruction for geothermal development in some locations in management prescriptions similar to Backcountry/Restoration and GFRG. It is unknown where and to what degree geothermal resources would be developed; however, since about half the roadless areas have high to moderate potential it is likely some development would eventually occur. Currently lease applications have been submitted for geothermal exploration, which could affect about 7,000 acres of the Peace Rock Roadless Area on the Boise National Forest and 33 acres of the West Panther Roadless Area on the Salmon National Forest. If fully developed, roads, transmission lines, and other facilities would likely be constructed, which could reduce the aquatic integrity of the roadless areas affected. Site-specific analysis would be completed prior to any geothermal exploration or development.

Due to the potential acres available for ground disturbing activities, this alternative is not likely to provide a high level of protection for aquatic biodiversity and native aquatic species including species strongholds, priority watersheds, bull trout core areas and T&E critical habitat in areas currently designated as Idaho Roadless Areas. Each Forest Land and Resource Management Plan is unique and would provide a unique set of guidance for Idaho Roadless Areas. In general, Forests have been moving more roadless areas into management prescriptions that conserve roadless characteristics. Five of the National Forests in Idaho have revised their plans since 1999, the remaining five Forest Plans are older. The newer plans generally place more value on providing for roadless characteristics.

Summary of Effects –

With the projected trend that road construction/reconstruction, timber cutting, and discretionary mineral activities would be highest under this alternative, and given the numerous negative direct, indirect, and cumulative effects to aquatic species and their habitats identified in the literature associated with these activities, the Existing Plans Alternative has the greatest potential for increased risk of adverse effects to aquatic animal species and aquatic habitats.

T & E species determination for the Existing Plans Alternative –

> Implementation of the Existing Forest Plans Alternative is not likely to have any additional effects beyond what has already been consulted on for the Forest Plans.

Sensitive species determination for the Existing Plans Alternative –

> May affect individuals, but is not likely to cause a trend towards Federal listing or a loss of viability for any sensitive species.

MIS species under the Existing Plans Alternative –

> No adverse affect to MIS on any of the National Forests within the analysis area.

Idaho Roadless Rule Alternative

The Idaho Roadless Rule Alternative proposes 5 themes for the Idaho Roadless Areas:

- Wild Land Recreation
- Primitive
- Backcountry/Restoration
- General Forest, Rangeland, and Grassland (GFRG)
- Special Areas of Historic or Tribal Significance (SAHTS)

Each theme contains different restrictions and permissions (see Chapter 2 for a detailed description of the alternative themes). Table 14 displays the acres associated with each theme. Projected road construction and reconstruction in Idaho Roadless Areas under this alternative is 4 miles per year. This estimate includes both permanent and temporary roads for timber cutting and non-timber related activities. The projected timber harvest offer of 4 MMBF is estimated to occur annually on 800 acres.

Of the 5 state Petition themes, the Wild Land Recreation, Primitive and SAHTS themes are the most restrictive because they only allow road construction, road reconstruction or timber cutting under very limited situations. Discretionary mineral activities are also very limited under these themes. Under this alternative, the Forest Service would not authorize road construction/reconstruction or surface occupancy for new mineral leases, including phosphates, in Idaho Roadless Areas managed under these three themes. However, the Forest Service could allow exceptions to the surface occupancy prohibition for geothermal resources under the primitive theme. SAHTS theme acres are to be managed under the primitive theme guidelines, except that the allowance for surface occupancy for geothermal would be precluded. Because of the prohibitions on ground disturbing activities within the Wild Land Recreation, Primitive and SAGTS, these themes should provide for good conditions for aquatic species and their habitats. Aquatic ecological values should be maintained under these themes. These themes provide the best protection for aquatic resources including TES and MIS species, T&E critical habitat, native fish strongholds, priority watersheds, and bull trout core areas.

The Backcountry/Restoration theme allows some road construction, road reconstruction, and timber cutting. The allowances include all the permissions in the 2001 Roadless Rule with the addition of allowing activities necessary to perform expedited hazardous fuel treatment in Backcountry/Restoration areas at significant risk of wildfire or insect/disease epidemics. Most new roads will be temporary, unless the responsible official determines that a permanent road meets the road exceptions and it will not substantially alter any of the roadless characteristics. The Backcountry/Restoration theme permits both surface occupancy and road construction/reconstruction to access known unleased phosphate deposits and geothermal resources.

A number of important aquatic areas fall into the Backcountry/Restoration theme. Of particular interest are areas associated with T &E fish species, stronghold populations, and areas providing for high species richness as measured by the overlap of multiple species. These areas are of particular interest because they represent high priority conservation areas. Under the Backcountry/Restoration theme these areas would not be provided the high level of protection for aquatic ecosystem integrity and natural processes to occur that the Wild Land Recreation and Primitive themes would offer. Table 15 displays Idaho Roadless Areas overlapping four threatened or endangered fish species, Idaho Roadless Areas that overlap with priority watersheds for steelhead trout, Chinook salmon, and bull trout, and Idaho Roadless Areas that overlap with large stronghold areas or strongholds for Multiple Species. The majority of the acres are in the Backcountry/Restoration theme.

About 0.6 million acres are in the GFRG theme. Road construction/reconstruction, timber cutting, and discretionary mineral activities would be permissible in these areas. The roadless characteristics and values in GFRG theme areas may not be maintained into the future. The GFRC theme would provide the least protection for aquatic habitats and species. About 5,400 acres of Idaho Roadless Areas within the GFRG theme are located in strongholds for multiple species (Table 15). There is no GFRG in roadless areas with high biodiversity (four threatened or endangered species) or that provide priority areas for multiple fish species. Portions of the Cuddy Mountain, French Creek, Mallard Larkins, Needles, Red Mountain, and Ten Mile/Black Warrior Roadless Areas are in the GFRG theme and overlap with one of the fish strongholds.

All the National Forests in Idaho—except for the Clearwater, Nez Perce, Challis, and Wallowa-Whitman—have roadless areas in the GFRG theme. The Caribou portion of the Caribou-Targhee National Forest has the most acreage of any of the forests in this theme (251,800 acres). Most of the Caribou's roadless areas in the GFRG theme support Bonneville cutthroat trout, an R4 sensitive species.

Table 15. Idaho Roadless Rule –Idaho Roadless Areas that Provide Important Aquatic TES Habitat

Forest	Idaho Roadless Area	Wild Land Recreation	Primitive	Backcountry Restoration	GFRG	Forest Plan Special Areas	SAHTS
Idaho Roadless Areas overlapping 4 threatened and endangered fish species							
Boise/ Challis/ Sawtooth	Hanson Lakes	13,600 0 15,100	3,800 0 2,500	0 13,500 13,700	0 0 0	200 0 8,600	0 0 0
Nez Perce	John Day	0	0	10,300	0	0	0
Nez Perce	North Fork Slate Creek	0	0	10,400	0	0	0
Payette	Hells Canyon/7 Devils Scenic	0	29,200	0	0	500	0
Payette	Patrick Butte	0	24,800	51,000	0	4,900	0
Sawtooth	Huckleberry	0	0	5,200	0	2,500	0
Sawtooth	Pettit	0	0	2,100	0	1,000	0
Wallowa-Whitman	Big Canyon Idaho	0	0	14,100	0	0	0
Wallowa-Whitman	Klopton Creek - Corral Creek Id	0	0	21,300	0	0	0
TOTAL		28,700	60,300	141,600	0	17,700	0
Idaho Roadless Areas overlapping priority watersheds for steelhead trout, Chinook salmon, and bull trout							
Challis	Challis Creek	0	0	44,300	0	0	0
Challis/ Sawtooth	Loon Creek	0 0	0 0	106,400 3,200	0 0	0 0	0 0
Nez Perce	Dixie Summit - Nut Hill	0	0	12,000	0	1,000	0
Nez Perce	East Meadow Creek	0	96,300	0	0	500	0
Nez Perce	John Day	0	0	10,300	0	0	0
Nez Perce	Little Slate Creek	0	0	12,200	0	0	0
Nez Perce	Mallard	0	0	19,600	0	0	0
Nez Perce	North Fork Slate Creek	0	0	10,400	0	0	0
Nez Perce	Salmon Face	0	0	9,200	0	0	0
Nez Perce	West Meadow Creek	0	0	115,600	0	300	0
Nez Perce/ Payette	Rapid River	0 0	16,700 51,700	0 0	0 0	4,300 6,000	0 0
Salmon/ Challis	Camas Creek	0	0	35,400 68,500	0	0	0
Salmon/ Challis	Lemhi Range	0	0	105,700 154,500	0	2,800 500	0

Forest	Idaho Roadless Area	Wild Land Recreation	Primitive	Backcountry Restoration	GFRG	Forest Plan Special Areas	SAHTS
Salmon/ Challis	Taylor Mountain	0	0	46,600 16,800	0	0	0
TOTAL		0	164,700	770,700	0	15,400	0
Idaho Roadless Areas that overlap large stronghold or strongholds for multiple aquatic species							
Boise	Deadwood	0	29,100	18,300	0	5,100	0
Boise	Peace Rock	0	137,400	47,200	0	7,100	0
Boise	Sheep Creek	0	67,400	0	0	3,000	0
Boise	Ten Mile/Black Warrior	76,500	37,000	0	1,100	4,200	0
Boise/ Challis	Red Mountain 916	85,900 0	11,800 0	11,400 4,900	600 0	700 0	0 0
Boise/ Payette	Needles	3,300 90,200	5,800 7,100	19,500 31,500	100 0	1,200 2,500	0
Boise/ Payette	Snowbank	0 0	34,200 1,500	0 0	0 0	0 0	0 0
Boise/ Sawtooth	Lime Creek	0 0	13,500 81,900	0 0	0 0	0 1,700	0 0
Boise/ Sawtooth	Smoky Mountains	0	41,800 191,900	0 102,600	0	1,100 9,600	0
Challis	Challis Creek	0	0	44,300	0	0	0
Challis	Seafoam	0	0	31,100	0	0	0
Challis	Squaw Creek	0	0	99,600	0	0	0
Challis/ Sawtooth	Boulder-White Clouds	115,800 115,500	0 87,300	23,500 84,500	0 700	0 34,700	0 0
Challis/ Sawtooth	Loon Creek	0 0	0 0	106,400 3,200	0 0	0 0	0 0
Clearwater	Bighorn - Weitas	0	0	246,900	0	400	7,500
Clearwater	Hoodoo	152,300	0	0	0	0	1,600
Clearwater	Lochsa Face	0	27,400	40,500	0	8,100	
Clearwater	North Lochsa Slope	0	27,300	70,800	0	5,800	13,800
Clearwater	Weir - Post Office Creek	0	0	19,800	0	500	1,700
Clearwater/ Idaho Panhandle	Mallard-Larkins	59,400 49,500	0 0	66,900 46,200	0 100	0 11,500	0 22,100
Clearwater/ Idaho Panhandle	Meadow Creek - Upper North Fork	0 0	0 0	4,500 47,700	0 0	1,500 0	0 0
Clearwater/ Nez Perce	Rackliff - Gedney	0 0	0 0	32,500 51,900	0 0	3,900 1,700	0 0
Idaho Panhandle/ Kootenai	Mt. Willard-Lake Estelle	0 0	0 0	36,600 23,200	0 0	1,400 200	0 0

Forest	Idaho Roadless Area	Wild Land Recreation	Primitive	Backcountry Restoration	GFRG	Forest Plan Special Areas	SAHTS
Nez Perce/ Payette	Rapid River	0	16,700 51,700	0	0	4,300 6,000	0
Payette	Cottontail Point/ Pilot Peak	0	36,700	54,500	0	1,700	0
Payette	Cuddy Mountain	0	36,500	0	2,700	1,800	0
Payette	French Creek	0	11,500	65,100	100	12,100	0
Payette	Patrick Butte	0	24,800	51,000	0	4,900	0
Payette	Secesh	110,300	7,700	118,500	0	11,600	0
Salmon/ Challis	Camas Creek	0	0	35,400 68,500	0	0	0
Salmon/ Challis	Lemhi Range	0	9,300	150,700 154,500	0	2,800 500	0
Sawtooth	Buttercup Mountain	0	56,300	400	0	0	0
TOTAL		858,700	1,053,600	2,343,500	5,400	151,600	46,700

There are 13,400 acres of known unleased phosphate deposits on the Caribou-Targhee NF. About 12,100 acres (90 percent) are located within the Backcountry/Restoration and GFRG themes. Under these themes road construction or reconstruction would be permissible to develop these phosphate deposits.

These deposits are located within nine roadless areas (Dry Ridge, Huckleberry Basin, Meade Peak, Sage Creek, Schmid Peak, and Stump Creek on the Caribou portion of the forest; and Bald Mountain, Bear Creek, and Poker Creek on the Targhee portion of the forest) and could eventually be mined over an extended period of time (50 or more years). There is a potential risk to habitats for sensitive aquatic species (Bonneville cutthroat trout and amphibians) on these 12,100 acres when and if this development should occur. Site-specific analysis would occur prior to any future leasing and mitigations applied. No threatened or endangered aquatic species are found in these roadless areas.

About 1,300 acres of unleased phosphate deposits are in the Primitive theme. The Primitive theme prohibits road construction/reconstruction or surface occupancy for phosphates; therefore, this area would likely not be developed.

The Idaho Roadless Rule would also permit road construction/reconstruction for geothermal development in the GFRG theme. About 7 percent of Idaho Roadless Areas are in this theme, and about 4 percent could be developed because of slope restrictions. It is likely some of these areas would be developed over time; however, except for two pending lease applications there is no information about where or when the activity would occur. If fully developed, roads, transmission lines, and other facilities would likely be constructed. Site-specific analysis would occur prior to exploration or development of geothermal energy resources and would include consideration of aquatic resources.

Currently lease applications have been submitted for geothermal exploration within 7,000 acres of the Peace Rock Roadless Area on the Boise National Forest and 33 acres of the West Panther Roadless Area on the Salmon National Forest. Both these areas are in either the Primitive or Backcountry/Restoration theme; therefore, they would not be developed because of the inability to construct roads to access the area.

Summary of Effects –

Idaho Roadless Areas in the Wild Land Recreation, Primitive, and SAHTS themes should be well protected from ground disturbing activities under this alternative because of the restricted permissions on activities related to road construction/reconstruction, timber cutting and discretionary minerals. These three themes should provide for natural processes, habitat integrity and species diversity. Areas proposed for the Backcountry/Restoration theme have a higher risk of ground disturbing activities (including road construction/reconstruction, timber cutting and discretionary minerals activities) occurring depending on future land uses and the risk of wildland fire. Areas proposed for the GFRG theme have the greatest potential for increased risk of adverse effects to aquatic animal species and habitat.

T & E species determination for the Idaho Roadless Rule Alternative –

> Implementation of the Idaho Roadless Rule alternative is not likely to have any adverse effects on aquatic species or habitats because the Rule does not directly authorize any ground-disturbing activities. The Idaho Roadless Rule Alternative may beneficially affect T&E species and their habitat in areas with the Wild Land Recreation, Primitive, or Special Areas themes.

Sensitive species determination for the Idaho Roadless Rule Alternative –

> Will not directly authorize ground-disturbing activities. Projects conducted later in time may affect individuals, but they are not likely to cause a trend towards Federal listing or a loss of viability for any sensitive species. The Idaho Roadless Rule may beneficially affect Forest Service Sensitive species and their habitat in areas with the Wild Land Recreation, Primitive, or Special Areas themes.

MIS species under the Idaho Roadless Rule Alternative –

> No adverse affect to MIS on any of the National Forests within the analysis area.

Terrestrial Animal Habitat and Species: Affected Environment

Idaho has a diverse assemblage of wildlife that occurs on an equally diverse landscape. There are approximately 1,191 native and non-native species of wildlife that occur within five ecoregions in Idaho (IDFG, 2005). Ecoregions denote geographic areas characterized by similar ecosystems and environmental resources. In Idaho these five ecoregions are further subdivided into 14 ecological sections which are expected to have similar species, habitats, and conservation needs (IDFG, 2005). Map 12 displays the Ecoregions and Ecosections for the State of Idaho.

Sixty-four percent of the landbase in Idaho is publicly owned. The largest percentage (38%) of the landbase in Idaho consists of National Forest System lands covering approximately 20,402,524 acres. Approximately 9,303,629 acres of the National Forest System lands in Idaho (46%) are classified as roadless, herein referred to as Idaho Roadless Areas (IRA). Table 16 displays the amount of National Forest System lands that falls within Idaho Roadless Areas by Ecoregion and Ecosection in Idaho.

Table 16: Acres and Percentage of National Forest System Lands and Idaho Roadless in Each Ecosection and Ecoregion of Idaho

Ecoregion	Ecosection	Acres (%) National Forest System Lands in Ecosection	Acres (%) of Ecosection in IRAs
Canadian Rocky Mountains			
	Okanogan Highlands	508,383 (31%)	173,719 (10%)
	Flathead Valley	405,076 (80%)	124,871 (25%)
	Bitterroot Mountains	2,727,812 (58%)	1,278,496 (27%)
Middle Rockies-Blue Mountains			
	Blue Mountains	866,747 (32%)	240,922 (9%)
	Idaho Batholith	8,807,965 (88%)	3,375,442 (34%)
	Challis Volcanics	2,567,941 (72%)	1,430,468 (40%)
	Beaverhead Mountains	1,928,178 (47%)	1,371,464 (34%)
Columbia Plateau			
	Palouse Prairie	24,963 (1%)	146 (0.01%)
	Owyhee Uplands	5,029 (<1%)	901 (0.01%)
	Snake River Basalts	81,272 (1%)	9,497 (0.12%)
	Northwestern Basin and Range	561,346 (15%)	182,564 (5%)
Utah-Wyoming Rocky Mountains			
	Yellowstone Highlands	441,946 (66%)	14,699 (2.2%
	Overthrust Mountains	1,475,866 (45%)	1,100,440 (34%)
Wyoming Basins			
	Bear Lake	0	0

TERRESTRIAL HABITATS WITHIN IDAHO ROADLESS AREAS

There are 275 IRAs distributed across ten National Forests in Idaho, with the Sawtooth National Forest having the largest acreage within IRA – 1,194,652 acres in 23 Idaho Roadless Areas. Idaho Roadless Areas vary in size. The Sawtooth National Forest hosts the largest roadless area in Idaho, the White Cloud-Boulder IRA which is 322,652 acres. The smallest roadless area is Lolo Creek on the Clearwater National Forest, which is 68 acres.

Idaho roadless areas support a range of habitat types such as grass and shrublands, young forested stands, and old-growth forests. Forests cover about 33 percent, or approximately 21.4 million acres of Idaho of which 76 percent is administered by USDA Forest Service. These forests vary from very dry Pinyon-Juniper woodlands at lower elevations to cold alpine forest types at high elevations. Within Idaho Roadless Areas, forest cover is dominated by three primary types: 40 percent Douglas-fir, 20 percent spruce-fir, and lodgepole pine at 8 percent (Martin 2007). All other forest cover types make up less than 5 percent each of total forest cover within IRAs. Non-forest habitat types within the Idaho Roadless Areas are estimated to be 18 percent of the landbase and include other vegetation types (grasslands, shrublands, meadows, etc.), and barren areas (rock, ice, etc.) (Martin 2007). Table 17 displays the approximate forest type acreage in the state and within National Forests of Idaho. In general, the predominant forest cover types within IRAs are the same three cover types found to be most common statewide (i.e., Douglas-fir, Spruce-fir, and Lodgepole pine).

Table 17: Forest Cover Types for State of Idaho and National Forests in Thousand of Acres

Forest Type	State	National Forest
Pinyon/Juniper	739	143
Douglas-fir	6,543	5,296
Ponderosa pine	1,539	1,076
Spruce-fir[1]	3,826	3,426
Lodgepole pine	2,273	2,095
Grand fir/Cedar/hemlock	3,182	1,792
Western larch	167	100
Other Softwoods	473	458
Aspen/Birch/Cottonwood	862	541
Other Hardwoods	207	106
Nonstocked	1,621	1,348

(Martin, 2007).

The character, distribution, and extent of habitats in Idaho roadless areas are affected by the size of an area, the kinds, intensity and timing of management-induced and natural disturbances that have occurred, and the landscape context within which they are found. In general, roadless areas provide large, relatively undisturbed blocks of important habitat for terrestrial animal species and communities. A majority of Idaho roadless areas provide high quality habitat for cavity and snag dependent species as well as summer and winter range for big game species. Other important habitat values and functions that Idaho roadless areas provide include the following:

- Dispersal corridors
- Connectivity between large blocks of habitat
- Travel corridors
- "Islands" of refugia
- Habitat diversity and complexity
- Old growth forests
- "Natural" levels of snag and down woody debris components within forested habitats across large areas
- "Source" habitats and "strongholds" for sensitive species
- Security and seclusion during incubation, hatching or birthing and rearing of young
- Reduced big game and furbearer vulnerability during hunting and trapping seasons as a result of limited access

EXISTING CONDITION OF IDAHO ROADLESS AREAS

Fire

In general, fire regimes within forested ecosystems in Idaho have been altered significantly from historic times. Following Euro-American settlement, there has been an increase in the number and extent of lethal, stand-replacing fires, and a decrease in non-lethal and mixed severity fires in both forested and rangeland ecosystems across the State (Quigley and Bigler-Cole 1997).

Noxious weeds

Approximately 1 percent of all National Forest system lands in Idaho are infested with noxious weeds, including over 28,000 acres or 0.3 percent of lands encompassed within Idaho roadless areas. Cheatgrass and spotted knapweed are two particularly aggressive invasive weeds that have altered habitats and forage availability for terrestrial wildlife species in Idaho (Quigley and Bigler-Cole 1997). To date, not all Idaho roadless areas, National Forests or other ownerships have been surveyed for noxious weeds (Martin, 2007).

Roads

Approximately 1,800 miles of roads currently exist on less than 5% of the land area in Idaho roadless areas (Bower, 2007). Some of these roads pre-date the inventories, some are unauthorized user created roads, while others have been constructed where land management plans have allowed development in Idaho roadless areas.

Mining

Valuable deposits of locatable mineral resources potentially exist in Idaho roadless areas. Leasable minerals in Idaho include energy mineral resources such as oil, gas, and geothermal and non-energy minerals such as phosphate.

The 1970's and 1980's saw extensive interest in eight of Idaho's ten National Forests with nearly 7.8 million acres of NFS lands reportedly leased for oil and gas (BLM; LR2000 database). Only the Boise and the Wallowa-Whitman National Forests avoided this period of leasing interest. With no commercial discovery of hydrocarbons, all of the oil and gas leases on NFS lands have expired and there are presently no active leases on any National Forest in Idaho.

Although some NFS lands in Idaho were leased for geothermal, they were never developed and these leases eventually expired. Presently, there are no geothermal leases on NFS lands in Idaho.

The Caribou National Forest contains significant deposits of economically recoverable phosphate that is used primarily in the production of fertilizers. Currently, the Caribou National Forest has 49 active phosphate leases affecting 27,515 acres of NFS lands. Of these active leases, approximately 9,100 acres are within six Idaho roadless areas, of which some areas already been mined; however the amount is unknown (Table 18). The phosphate deposits generally exist on the edges of the IRA.

Table 18: Summary of Idaho Roadless Area Acres Potentially Affected by Phosphate Mining (Abing 2007)

IRA	Acres Under Existing Lease	KPLA Location within IRA	Estimated % of IRA affected	KPLA acres with potential to be leased	Estimated % of IRA affected
Dry Ridge	1,400	Eastern edge	6	800	3
Huckleberry Basin	3,200	Northwest edge	16	1,400	7
Meade Peak	500	Northeast edge	1	2,500	6
Sage Creek	2,700	Southern portion	21	1,700	13
Schmid Peak	40	Eastern edge	<1	20	<1
Stump Creek	160	Southern edge	< 1	120	<1
Bald Mountain	0	Northeast edge	0	1,400	8
Bear Creek	0	Northeast edge	0	5,100	5
Poker Creek		Northeast edge	0	400	2
Mount Jefferson	1,100		2	0	0
Totals	9,100		<1% of total IRA acres forest-wide	13,440	

TERRESTRIAL WILDLIFE SPECIES IN IRAS

We reference two primary types of data on terrestrial wildlife species in this section: predicted distribution and occurrences. Predicted distributions of species throughout Idaho and within IRAs are based on the Wildlife Habitat Relationships Models (WHR), A Gap Analysis of Idaho: Final Report. Idaho Cooperative Fish and Wildlife Research Unit, Moscow, ID (Scott et al. 2002 as referenced in IDFG 2005). These data provide a 'course filter' approach to evaluating likely distributions of species based on ecological conditions and habitat associations within known species distributions. Occurrences represent point data provided by the Idaho Conservation Data Center, Idaho Department of Fish and Game (2005). These data vary in terms of their origin and how they were collected. Consequently, they provide a good representation of where we know the species occurs or has occurred in the past, but may not tell us necessarily where the species does not occur.

Threatened and Endangered Species

Idaho roadless areas provide habitat for two endangered terrestrial wildlife species – the Gray wolf (north of I-90) and the woodland caribou – one experimental, non-essential species – the gray wolf south of I-90 – and four threatened terrestrial wildlife species – the Canada lynx, the grizzly bear (not including the Yellowstone DPS), the northern Idaho ground squirrel, and the bald eagle (recently removed from the list of threatened species on 8/07).

GAP analysis information was used to determine the predicted distribution of these threatened and endangered species within their general ranges in Idaho and within Idaho roadless areas. Table 19 displays the acres of predicted distribution Federally listed species in the State and in Idaho roadless areas as well as the percent of the statewide distribution that falls within Idaho roadless areas. Table 19 also reports on known occurrences of each threatened, endangered or experimental, nonessential species in Idaho roadless areas and the number of Idaho roadless areas and National Forest(s) that overlap with the predicted distribution of each species.

Table 19: Predicted Distribution and Occurrences of Endangered and Threatened Terrestrial Wildlife Species of Idaho Roadless Areas

Species	State Ranking/Species of Greatest Conservation Need	Habitat Description	Acres of Predicted Distribution*		%Predicted Distribution within IRAs	Known Occurrences of Species in IRAs?
			In Idaho	In IRAs		
Endangered Mammals						
Gray wolf (*Canis lupus*)	S3-Yes	Variety of habitats at various elevations with abundant ungulate prey	16,654,526	Not Available at this time (6/28/07)	Not Available at this time (6/28/07)	Known occurrences in 3 IRAs of the Idaho Panhandle NF
Woodland caribou (*Rangifer*	S1-Yes	Mature forests dominated by subalpine fir and	446,345	128,482	29%	One known occurrence in one IRA of the

Species	State Ranking/Species of Greatest Conservation Need	Habitat Description	Acres of Predicted Distribution*		%Predicted Distribution within IRAs	Known Occurrences of Species in IRAs?
			In Idaho	In IRAs		
tarandus)		Engelmann spruce				Idaho Panhandle NF
Threatened Mammals						
Canada lynx (*Lynx canadensis)*	S1-Yes	Montane and subalpine mixed coniferous forests of lodgepole, typically above 4000 ft with deep snow abundant hares and red squirrels	12,364,805	3,740,350	30%	39 IRAs with known lynx occurrences on 10 National Forests
Gray wolf (10j rule) (*Canis lupus*)	S3-Yes	Variety of habitats at various elevations with abundant ungulate prey	16,654,526	5,669,099	34%	Known occurrences in 3 IRAs; one on the Clearwater, Nez Perce and Caribou National ForestsF
Grizzly bear (*Ursus arctos horribilis)*	S1-Yes	Variety of habitats at various elevations at different times of the year	2,009,270	276,201	27%	Known occurrences in 4 IRAs on the Idaho Panhandle NF
Northern Idaho ground squirrel (*Spermophilus brunneus brunneus)*	S1-Yes	Dry mountain meadows of grasses and forbs surrounded by Ponderosa pine or Douglas-fir at elevations between 3280-5600 ft.	847,292	220,896	26%	Occurs on the Payette National Forest. Known locations are not in IRAs.
Threatened Birds						
Bald eagle (*Haliaeetus leucocephalus)*	S3B-Yes; S4-No	Large trees for nesting near fish bearing aquatic ecosystems	535,151,478	2,704,470	5%	15 IRAs on 8 Forests have known bald eagle occurrences

**Predicted Distribution information is approximate and derived from the Wildlife Habitat Relationships Models, A Gap Analysis of Idaho: Final Report. Idaho Cooperative Fish and Wildlife Research Unit, Moscow, ID (Scott et al. 2002).*

S1=State Critically imperiled: at high risk because of extreme rarity, rapidly declining numbers, or other factors that make it particularly vulnerable extirpation in the state.

S1B=Breeding:conservation status refers to the breeding population of the species.

S2B=Nonbreeding: conservation status refers to the non-breeding population of the species.

S2=State Imperiled: at risk because of restricted range, few populations, rapidly declining numbers or other factors that make it vulnerable to rangewide extinction or extirpation.

S3=State Vulnerable: at moderate risk because of restricted range, relatively few populations, recent and widespread declines, or other factors that make it vulnerable to rangewide extinction or extirpation.

SNA=Not Applicable: a conservation status rank is not applicable because the species is not a suitable target for conservation activities

Maps of the predicted distribution of each threatened or endangered species in the State of Idaho are APPENDED. The endangered gray wolf (Map 13) and woodland caribou (Map 14) as well as the threatened grizzly bear (Map 15) occur only in northern Idaho on the Idaho Panhandle National Forest. All three species are known to utilize habitat available in Idaho roadless areas. The woodland caribou is known to occur in the Salmo-Priest Roadless Area. Gray wolves are known to occur in Blacktail Mountain, Continental Mountain and Salmo-Priest Roadless Areas.

Grizzly Bear Management Units overlap with 15 Idaho Roadless Areas of the Idaho Panhandle National Forest. Grizzly bears are known to occur in the Blacktail Mountain Continental Mountain, Little Grass Mountain, and Salmo-Priest roadless areas.

One threatened species, the Northern Idaho ground squirrel (Map 16), occurs only on the Payette National Forest. The predicted distribution of this species overlaps with IRAs, but to date there are no known locations within any Idaho Roadless Areas.

South of Interstate 90, gray wolves (Map 13) are classified as an experimental, nonessential population. Thirty-four percent of the predicted distribution of gray wolves south of Interstate 90 overlaps with Idaho roadless areas. There are known occurrences of gray wolves in the Mallard, Weir-Post Office and Sage Creek IRAs of the Nez Perce, Clearwater and Caribou National Forests, respectively.

Canada Lynx (Map 17) Analysis Units overlap with IRAs on ten National Forests in Idaho. Lynx occurrences have been documented in 39 IRAs within the State.

Idaho roadless areas also provide habitat for bald eagles, a recently delisted species, both during the breeding season and in winter. Fifteen IRAs have known occurrences of the bird and eight National Forests in Idaho have IRAs that overlap with their predicted distribution.

FOREST SERVICE SENSITIVE SPECIES

Eight mammals, one reptile and 17 birds, listed as Forest Service sensitive species, have predicted distributions in Idaho roadless areas. Of these 26 sensitive species, 22 are known to occur within IRAs. Sensitive species and their habitat requirements are listed in Table 22.

GAP analysis information was used to determine the predicted distribution of these sensitive species within their general ranges in Idaho and whether or not they occur within Idaho roadless areas. Table 20 displays the acres of predicted distribution for sensitive species in both the State and in Idaho roadless areas as well as the percent of predicted distribution in IRAs. Table 20 also displays known occurrences of each sensitive species in Idaho roadless areas as well as the number of IRAs and National Forest(s) that overlap with the predicted distribution of each species.

Table 20: Predicted Distribution and Occurrences of Forest Service Sensitive Terrestrial Wildlife Species of Idaho roadless areas

Species	State Ranking/ Species of Greatest Conservation Need?	Habitat	Acres of Predicted Distribution*		%Predicted Distribution within IRAs	Known Occurrences of Species in IRAs?
			In Idaho	Within IRAs		
Sensitive Mammals						
Fisher (*Martes pennanti)*	S1-Yes	Dense, mesic old growth, especially spruce fir associated with riparian areas that have >50% crown closure and abundant snags and downed woody debris	11,889,633	3,601,084	30%	Known occurrences in 37 IRAs on 8 National Forests
Fringed myotis (*Myotis thysanodes)*	S2-Yes	Low-and mid-elevation mines in steep river valleys, large canyons or other sites having steep and rock terrain	3,621,777	122,920	3.4%	One known occurrence in the Caribou City IRA of the Caribou NF
Grizzly bear (*Ursus arctos horribilis)*	S3-Yes	Large tracts of undisturbed habitat with a variety of aspects, elevations and vegetative communities	2,009,270	61,194	18%	Known occurrences in 4 IRAs of the Targhee NF
Northern bog lemming (*Synaptomys borealis)*	S1-No	Sphagnum moss dominated fens/bogs in or adjacent to conifer forests often in alpine zones	547,937	132,172	24%	Known occurrences in two IRAs of the Idaho Panhandle NF
Pygmy rabbit (*Brachylagus idahoensis)*	S2-Yes	Tall stands of big sagebrush growing on deep soils with grasses and forbs	13,948,908	961,544	7%	Four IRAs with known pygmy rabbit occurrences on the Salmon and Challis o National Forests
Spotted bat (*Euderma maculatum)*	S3-Yes	Xeric and riparian habitats in deep, narrow canyons with cliffs and rocky outcrops	5,755,787	109,600	1.9%	Three National Forests with occurrences; no known occurrences in IRAs.
Townsend's big-eared bat (*Corynorhinus townsendii)*	S3-Yes	A wide variety of habitats from arid sagebrush and juniper breaks to high elevation forests including caves, mines, and rock crevices	3,604,080	120,391	3.3%	8 IRAs on 4 National Forests with known occurrences
Wolverine (*Gulo gulo*)	S2-Yes	Wide ranging species that prefers extensive tracts of remote wilderness coniferous forests and riparian areas in winter; often associated with talus and downed woody debris for denning	13,745,972	5,754,837	42%	48 IRAs with known occurrences on 10 National Forests

Species	State Ranking/ Species of Greatest Conservation Need?	Habitat	Acres of Predicted Distribution*		%Predicted Distribution within IRAs	Known Occurrences of Species in IRAs?
			In Idaho	Within IRAs		
Sensitive Birds						
American peregrine falcon (*Falco peregrinus anatum*)	S2B-Yes	Cliff habitat over 200 feet high with ledges suitable for nesting usually associated with river corridors, reservoirs or lake basins	34,165,535	7,716,484	23%	Known occurrences in 13 IRAs on 6 National Forests
Black-backed woodpecker (*Picoides arcticus*)	S3-No	Mature, montane coniferous forests with abundant dead and dying fire-killed or insect infested trees for foraging and nesting	16,780,073	5,223,339	31%	One known occurrence in the Mallard IRA of the Nez Perce
Black swift (*Cypseloides niger*)	S1B-Yes	Rock ledges associated with waterfalls	11,371,633	3,280,491	29%	Two known locations on Idaho Panhandle NF; no known locations in IRA
Boreal owl (*Aegolius funereus*)	S1-Yes	Mature, mixed stands of subalpine fir and Engelmann spruce with cavities	18,584,513	6,111,298	33%	Known occurrences in 33 IRAs
Columbian sharp-tailed grouse (*Tympanuchus phasianellus)*	S1-Yes	Mid-tall prairie grasslands, upland sagebrush and montane scrub during breeding and riparian scrub and open coniferous forests in winter	Not Available at this time (6/28/07)	Not Available at this time (6/28/07)	Not Available at this time (6/28/07)	Known occurrences in 4 IRAs on the Sawtooth NF; One known occurrence on the Caribou NF
Common loon (*Gavia immer*)	S1B-Yes; S2N-No	Clear, fish bearing lakes >22 acres in size	566,654	13,823	2.4%	Known occurrences in three IRAs; one in Winegar Hole IRA of the Targhee and two on the ID Panhandle; Upper Priest #123 and Blacktail Mtn #122
Flammulated owl (*Otus flammeoulus*)	S3B-Yes	Open ponderosa pine or mixed conifer forests with cavities for nesting intermixed with grassy openings and dense thickets	9,136,949	2,395,191	26%	Known occurrences in 18 IRAs on 10 National Forests
Great gray owl (*Strix nebulosa*)	S3-No	Mixed coniferous forests bordering small openings	18,909,374	5,940,041	31%	Known occurrences in 10 IRAs on 6 National

Species	State Ranking/ Species of Greatest Conservation Need?	Habitat	Acres of Predicted Distribution*		%Predicted Distribution within IRAs	Known Occurrences of Species in IRAs?
			In Idaho	Within IRAs		
						Forests
Greater Sage grouse (*Centrocercus urophasianus*)	S2-Yes	Sage brush grasslands	21,424,203	1,294,843	6%	
Harlequin duck (*Histrionicus histrionicus)*	S1B-Yes	Low-gradient streams with boulders and downed logs and streamside vegetation	1,560,081	420,657	27%	Known occurrences in 11 IRAs on 3 National Forests
Mountain plover (*Charadrius montanus)*	SNA-Yes	Short-grass prairie; bare ground or prairie dog towns	Not Available at this time (6/28/07)	Not Available at this time (6/28/07)	Not Available at this time (6/28/07)	Not Available at this time (6/28/07)
Mountain quail (*Oreortyx pictus)*	S1-Yes	Shrub dominated communities of hawthorn, willow and chokecherry near riparian areas	6,654,270	697,201	10.5%	Known occurrences in 8 IRAs on 4 National Forests
Northern goshawk (*Accipiter gentiles*)	S3-No	Large tracts of mature, closed canopy, deciduous, coniferous and mixed forests with an open understory	19,822,640	6,436,290	32.5%	Known occurrences in 17 IRAs on 7 National Forests
Pygmy nuthatch (*Sitta pygmaea)*	S1-Yes	Primarily associated with mature dry forest types of ponderosa pine and Douglas-fir with snag cavities	5,018,652	1,107,757	22%	One IRA with known occurrence; White Cloud Boulder
Three-toed woodpecker ((*Picoides tridactylus)*	S2-Yes	Mature and over-mature coniferous forests with dead and dying trees infested with insects	7,596,093	2,639,142	35%	Ten IRAs with known occurrences on 8 National Forests
Trumpeter swan (*Cygnus buccinator)*	S1B-Yes; S2No	Shallow wetlands and slow moving streams with emergent and submergent aquatic vegetation	202,346	7	<1%	Three IRAS with known occurrences; Garns Mountain; Winegar Hole and Raynolds Pass of the Targhee NF
White-headed woodpecker (*Picoides alborlarvatus)*	S2-Yes	Multi-storied and open-canopied ponderosa pine and ponderosa pine/Douglas-fir forests with large trees and snags	4,771,985	1,067,445	22%	4 IRAs with known occurrences on the Payette and Wallowa-Whitman National

Species	State Ranking/ Species of Greatest Conservation Need?	Habitat	Acres of Predicted Distribution*		%Predicted Distribution within IRAs	Known Occurrences of Species in IRAs?
			In Idaho	Within IRAs		
						Forests
Sensitive Reptiles						
Ringneck Snake (*Diadophis punctatus*)	S2	Variety of habitats including woodlands, grasslands, shrubby areas and rocky canyons	1,533,249	97,819	6.4%	Known Occurrences in 2 IRAs of the Caribou NF

**Predicted Distribution information is approximate and derived from the Wildlife Habitat Relationships Models, A Gap Analysis of Idaho: Final Report. Idaho Cooperative Fish and Wildlife Research Unit, Moscow, ID (Scott et al. 2002).*

S1=State Critically imperiled: at high risk because of extreme rarity, rapidly declining numbers, or other factors that make it particularly vulnerable extirpation in the state.

S1B=Breeding:conservation status refers to the breeding population of the species.

S2B=Nonbreeding: conservation status refers to the non-breeding population of the species.

S2=State Imperiled: at risk because of restricted range, few populations, rapidly declining numbers or other factors that make it vulnerable to rangewide extinction or extirpation.

S3=State Vulnerable: at moderate risk because of restricted range, relatively few populations, recent and widespread declines, or other factors that make it vulnerable to rangewide extinction or extirpation.

SNA=Not Applicable: a conservation status rank is not applicable because the species is not a suitable target for cons

Maps of the predicted distribution of sensitive species in the State of Idaho are appended. Several sensitive species have less than 10 percent of predicted distribution in Idaho roadless areas including:

- Trumpeter swan – less than 1 percent
- Spotted bat – 1.9 percent
- Common loon – 2.4 percent
- Townsend's big-eared bat – 3.3 percent
- Fringed myotis – 3.4 percent
- Ring-necked snake – 6.4 percent
- Pygmy rabbit – 7 percent
- Greater sage grouse – 6 percent
- Columbian sharp-tailed grouse – 6.1 percent

Species occurrence information may be lacking on sensitive species because wildlife survey work may not be complete in Idaho roadless areas. Sensitive species with no known occurrences in Idaho roadless areas at this time are the spotted bat and black swift. Species with occurrences in three or fewer Idaho roadless areas are the fringed myotis, northern bog lemming, black-backed woodpecker, trumpeter swan, common loon, pygmy nuthatch, and ringneck snake.

Fringed myotis, common loon, trumpeter swan and ringneck snake have a predicted distribution of less than 7 percent and three or fewer occurrences in Idaho roadless areas.

Flammulated owls and wolverines occur in Idaho roadless areas on all ten National Forests in Idaho. Wolverines have the highest percentage (42%) of predicted distribution and occur within the most Idaho roadless areas (48). Remoteness and inaccessibility are important habitat attributes for wolverines and this high rate of occurrence and predicted distribution suggests the importance of Idaho roadless areas to wolverines.

The 91 Roadless Areas on the Idaho Panhandle National Forest have the most sensitive species associated with them. Eleven sensitive species – the northern bog lemming, fisher, wolverine, boreal owl, common loon, flammulated owl, great gray owl, harlequin duck, goshawk, Townsend's big-eared bat and three-toed woodpeckers – are known to occur in at least one Roadless Area on the Idaho Panhandle National Forest.

Based on occurrence data and predicted distribution, the northern bog lemming is only found on the Idaho Panhandle National Forest. Northern bog lemmings are known to occur in Blacktail Mountain and Selkirk, two of the 91 Roadless Areas on the Idaho Panhandle National Forest.

The Yellowstone grizzly bear population was delisted in March 2007 and managed as a sensitive species on the Targhee National Forest. This population overlaps the Yellowstone Highlands ecosection of Idaho. There are 61,194 acres of predicted distribution for grizzly bears in the Yellowstone Highlands. Grizzly bears occur in the Bald Mountain, Bear Creek, Lionhead and Two Top roadless areas on the Targhee National Forest.

Columbian sharp-tail grouse occur in four Idaho roadless areas on the Sawtooth National Forest and one Idaho Roadless Area on the Caribou National Forest. Shrubland habitat available on the Caribou National Forest and within Idaho roadless areas may be used by Columbian sharp-tailed grouse during the winter months. There are 15 Idaho roadless areas within one mile of Columbian sharp-tailed grouse leks on the Caribou National Forest. No studies have been done to determine Columbian sharp-tailed grouse habitat use on the Caribou National Forest (Orme, personal communication).

There are 125 Idaho roadless areas that have known occurrences of at least one threatened, endangered or sensitive terrestrial wildlife species. Table 21 displays the 13 Idaho roadless areas by National Forest with the occurrence of five or more threatened, endangered and sensitive species.

Table 21: Idaho roadless areas with the most Threatened, Endangered and Sensitive Terrestrial Species

National Forest	Inventoried Roadless Area	Number of TES Species
Idaho Panhandle	Salmo Priest	7
Idaho Panhandle	Blacktail Mountain	6
Idaho Panhandle	Selkirk	6
Idaho Panhandle	Upper Priest	5
Targhee	Mt. Jefferson	7
Targhee	Garns Mountain	5
Payette	French Creek	7
Payette	Hells Canyon/7 Devils Scenic	6

National Forest	Inventoried Roadless Area	Number of TES Species
Payette	Needles	5
Payette-Nez Perce	Rapid River	5
Nez Perce	Mallard	7
Salmon-Challis	West Big Hole	5
Sawtooth	Hanson Lakes	5

MANAGEMENT INDICATOR SPECIES

Management indicator species (MIS) are monitored over time to assess the effects of management activities on their populations and habitat, and the populations of other species with similar habitat needs. The ten National Forests in Idaho have designated 11 mammals and 20 birds as Management Indicator Species. Aspen is a management indicator community designated by the Caribou National Forest. Table 22 displays the terrestrial wildlife species selected to serve as management indicators by each National Forest in Idaho.

Table 22: Terrestrial Management Indicator Species of Idaho Forests

MIS Species	Boise	Caribou	Challis	Clearwater	Idaho Panhandle	0ez Perce	Payette	Salmon	Sawtooth	Targhee
MAMMALS										
Elk				X	X	X				X
Fisher						X				X
Gray wolf				X	X	X				X
Grizzly bear				X	X	X				X
Pine Marten				X	X	X				X
Moose				X	X	X				
Red squirrel										X
Townsend's big-eared bat										X
White-tailed deer				X	X					
Wolverine										X
Woodland caribou					X					
BIRDS										
Bald eagle				X	X	X				X
Belted kingfisher				X						
Black-backed woodpecker										X
Boreal owl										X
Common loon										X
Downy woodpecker										X
Flammulated owl										X
Great gray owl										X

MIS Species	**Boise**	**Caribou**	**Challis**	**Clearwater**	**Idaho Panhandle**	**0ez Perce**	**Payette**	**Salmon**	**Sawtooth**	**Targhee**
Hairy woodpecker										X
Harlequin duck										X
Northern goshawk		X		X	X	X				X
Northern flicker										X
Peregrine falcon				X		X				X
Pileated woodpecker	X		X	X	X	X	X	X	X	
Red-napped sapsucker										X
Three-toed woodpecker										X
Sage grouse		X	X					X	X	
Trumpeter swan										X
Williamson's sapsucker										X
White-headed Woodpecker	X						X			

Bolded Species = Management indicator species that are NOT threatened, endangered or sensitive species
Italics =Management Indicator Species that are threatened, endangered or sensitive species

Four of the 31 management indicator species are threatened or endangered species and have been discussed in that previous section. Fifteen of the 31 management indicator species are sensitive species and have been discussed in that section above. There are twelve management indicator species not previously discussed in the context of Idaho roadless areas.

There are 17,266,380 acres of pileated woodpecker habitat in the State of Idaho. Pileated woodpeckers were selected by eight of the ten National Forests in Idaho to be management indicator species. Table 23 displays the acres and percent of predicted distribution of pileated woodpeckers on each Forest and within IRAs where it is a management indicator species

Table 23: Pileated Woodpecker Predicted Distribution and Percentage by Forest

National Forest	**Acres and Percent of Predicted Distribution**		
	On Forest	**Within IRAs**	**% Within IRAs**
Boise	776,283	659,946	46%
Clearwater	595,498	773,369	57%
Idaho Panhandle	1,619,198	708,259	30%
Nez Perce	1,367,221	443,107	25%
Payette	1,164,196	691,339	37%
Salmon-Challis	1,544,872	1,418,873	48%
Sawtooth	637,769	896,475	71%

Thirty-one percent (12,658,638 acres) of the pileated woodpecker habitat in State of Idaho occurs on these eight Forests. Forty-two percent (5,332,662 acres) of the predicted distribution of pileated woodpeckers occurs within Idaho roadless areas on these eight Forests where the bird is a management indicator.

Table 24: Acres and Percent Predicted Distribution of the Management Indicators of the Clearwater, Idaho Panhandle and Nez Perce National Forests

MIS	Acres in ID	Acres Predicted Distribution and Percent								
		Clearwater NF			Idaho Panhandle NF			Nez Perce NF		
		Forest	IRA	% in IRA	Forest	IRA	% in IRA	Forest	IRA	% in IRA
Elk	36,990,587	725,348	969,195	57%	1,803,311	773,351	30%	1,629,048	484,936	23%
White-tailed Deer	23,210,569	718,644	963,470	57%	1,781,528	770,793	30%	NA	NA	NA
Moose	19,657,721	600,042	780,437	57%	1,628,247	710,526	30%	1,374,435	444,833	25%
Pine Marten	18,361,762	595,409	773,369	57%	1,619,124	708,243	30%	1,367,182	443,107	25%
Belted Kingfisher	303,303	1,330	1,900	<1%	NA	NA	NA	NA	NA	NA

NA – not applicable because the species is not an indicator on the Forest

The Targhee National Forest has seven management indicator species. Table 25 displays the acres and percent predicted distribution of the management indicator species of the Targhee National Forest.

Table 25: Acres and Percent Predicted Distribution of the Seven Management Indicators of the Targhee National Forest

Management Indicator Species	Total Acres Predicted Distribution in Idaho	Total Acres Predicted Distribution on Forest	Total Acres Predicted Distribution in IRAs	Percent of Predicted Distribution in IRAs
Downy Woodpecker	53,515,148	504,499	113,332	18%
Elk	36,990,587	797,533	704,659	47%
Hairy Woodpecker	20,243,531	550,912	457,627	45%
Northern Flicker	51,744,314	810,988	700,109	46%
Red-napped sapsucker	20,152,378	593,627	456,375	44%
Red Squirrel	19,001,726	455,533	422,251	48%
Williamson’s sapsucker	15,595,863	545,649	455,123	46%

Idaho Species of Concern

The Idaho Conservation Data Center recognizes 379 terrestrial wildlife species that regularly occur and breed in the State. This list includes 15 amphibians, 22 reptiles, 104 mammals and 238 birds (Scott et al. 2002). The number of State “species of concern” ranked from S1 to S3 that are not included as threatened, endangered, experimental, nonessential, sensitive or management indicator species previously discussed in this document are displayed in Table 26.

Table 26: Number of Idaho Species of Concern Not Discussed Elsewhere

Taxa	S1	S2	S3	Total
Birds	16	18	34	68
Mammals	10	7	12	29
Reptiles	1	2	1	5
Insects	8	2	0	10

Migratory Birds

The Idaho Partners in Flight Idaho Bird Conservation Plan (2000) identifies priority species and habitats and establishes objectives for bird populations and habitats in the State of Idaho. The northern two-thirds of Idaho are located within the Central Rocky Mountains Physiographic Area 64. The rest of Idaho is within the Columbia Plateau Physiographic Area 89.

Idaho Priority Bird Species and Habitats – Breeding bird surveys are conducted annually during the peak of the nesting season across North America. Breeding bird survey routes are randomly located in order to sample habitats that are representative of the entire region (Sauer et al. 2005). There are 56 permanent active breeding bird survey routes in Idaho. Most of these routes have had breeding bird surveys conducted annually since the 1960's. Seven National Forests have breeding bird survey routes and twelve routes occur within all or portions of Idaho roadless areas.

Table 27: Migratory Bird Information

BBS Route Name	Dominant Landcover Type	Forest	Idaho Roadless Area	# Bird Species on Route	#S1-S3 Priority Bird Species
Yellow Pine	Evergreen Forest	Boise	Horse Heaven	86	Goshawk, sandhill crane, black-backed woodpecker, three-toed woodpecker, olive-sided flycatcher
Pierce	Evergreen Forest	Clearwater	Bighorn-Weitas Siwash	80	Vaux's swift olive-sided flycatcher
Avery	Evergreen Forest	Idaho Panhandle	Grandmother Mountain	72	Vaux's swift Olive-sided flycatcher
N Fork Cedar	Evergreen Forest	Idaho Panhandle	Spion Kop	79	Bald eagle, Vaux's swift, olive-sided flycatcher
Nez Perce	Evergreen Forest	Nez Perce	Ohara-Falls Creek Rackliff-Gedney	89	Vauz's swift, Lewis's woodpecker
Nez Perce NF	Evergreen Forest	Nez Perce	Gospel Hump Mallard	75	Olive-sided flycatcher
Challis	Shrubland	Salmon-Challis	Taylor Mountain	110	Peregrine falcon Lewis's woodpecker Sage thrasher Brewer's sparrow
Cobalt	Evergreen Forest	Salmon-Challis	Deep Creek Perreau Creek	69	Goshawk Olive-sided flycatcher

BBS Route Name	Dominant Landcover Type	Forest	Idaho Roadless Area	# Bird Species on Route	#S1-S3 Priority Bird Species
					Brewers sparrow
Leadore	Shrubland	Salmon-Challis	Goat Mountain	103	Ferruginous hawk, sage grouse, sandhill crane, sage thrasher, Brewers sparrow, grasshopper sparrow
Sunbeam	Evergreen Forest	Salmon-Challis	Squaw Creek	57	Goshawk, olive-sided flycatcher
Alturas	Evergreen Forest; Grasslands/Heraceous	Sawtooth	Smoky Mountains	83	Pygmy nuthatch; Brewers sparrow, Olive-sided flycatcher, sandhill crane
Magic Mountain	Shrubland	Sawtooth	Fifth Fork Rock Creek Third Fork Rock Creek	129	Goshawk, sandhill crane, Lewis's woodpecker, Olive-sided flycatcher, sage thrasher, Brewer's sparrow, sage sparrow, grasshopper sparrow

Table 28: Other Species Known to Occur in Inventoried Roadless Areas

Mule deer	Coast Mole	Black-crowned night-heron
Mountain lion	Dwarf shrew	Sandhill crane
Black bear	Dark Kangaroo mouse	Hooded merganser
Mountain goat	Little pocket mouse	Brewer's sparrow
Big-horn sheep	Idaho Pocket gopher	Burrowing owl
Antelope	Merriam's shrew	California gull
Blue grouse	Red-tailed chipmunk	Caspian tern
Spruce grouse	Townsend's pocket gopher	Red-necked grebe
Ruffed grouse	Unita chipmuck	Long-billed curlew
Turkeys	Rock squirrel	White-faced ibis
Chukars	Pygmy shrew	Cattle Egret
Pika	Pinion mouse	Snowy egret
Beaver	Osprey	Clark's grebe
Bobcat	Golden eagle	Western grebe
Kit fox	Vesper sparrow	Forster's tern
Mink	Great horned owl	Franklin's gull
Muskrat	Varied thrush	Great egret
weasel	Mountain chickadee	Lesser goldfinch
River otter	Yellow warblers	Yellow-billed cuckoo
Badger	Virginia's warbler	Lewis' woodpecker
coyote	Pinion jay	Upland sandpiper
Snowshoe hare	Ferruginous hawk	Juniper titmouse
Red-backed voles	Prairie falcon	White-winged crossbill
Meadow voles	Ravens	Great basin collared lizard
Southern Idaho ground squirrel	Merlin	Ground snake

Wyoming ground squirrel	Swainson's hawk	Long nose snake
Merriam's ground squirrel	Short-eared owl	Northern alligator lizard
Piute ground squirrel	American White Pelican	
Cliff chipmunk	Black Tern	

BIODIVERSITY AND SPECIES RICHNESS

In the ecological literature, diversity refers to both the number of species present and their relative abundance. Thus, an area with many abundant species is more "diverse" than an area with an equal number of species, few of which are abundant and most of which are rare. Marcot et al. (1997) examined centers of endemism (restricted to a small areas) and high biodiversity within the Interior Columbia Basin, much of which covers the State of Idaho. Two centers overlapped with Forest Service lands in Idaho, one located on the upper Panhandle of Idaho, characterized by mixed conifer forests, and another located in the southwestern edge of the State along the Salmon River and Hell's Canyon.

Based on the predicted distributions for the 42 TES and/or MIS species and boundaries for IRAs, all of the IRAs overlapped with the predicted distribution of at least 13 species (Table 29). In general, these findings corroborated that reported by Marcot et al. (1997). In particular, high species richness was noted in IRAs in the Idaho Panhandle and along the southwestern Idaho Forests (Table 30 and Map 18)

Table 29: The number of species' predicted distributions that overlap IRAs.

# of species	# of IRAs
13-17	24
18-22	37
23-25	49
26-28	112
29-32	51

Table 30: Species Richness in IRAs by Forest

Forest	13-17	18-22	23-25	26-28	29-32
Boise	0	0	8	20	14
Caribou	11	23	0	0	0
Clearwater	0	1	10	5	0
IPNF	0	1	5	27	14
Nez Perce	0	0	0	11	7
Payette	0	0	2	10	10
Salmon-Challis	4	5	15	33	1
Sawtooth	10	0	3	6	4
Targhee	0	8	7	1	0
Wallowa-Whitman	0	0	0	0	2

Terrestrial Wildlife Habitats and Species: Effects

The three alternatives under evaluation represent different management strategies prescribing the conditions under which road construction/reconstruction, timber cutting, and discretionary mining could occur within Idaho roadless areas. All of the alternatives may permit these activities within IRAs, albeit they vary with respect to the circumstances, locations, and extent that these activities are permissible. It is this 'variation' that we seek to evaluate in this document. To minimize the need to reiterate effects of these activities under all alternatives, we provide a general discussion on the impacts of road construction/reconstruction, timber cutting, and discretionary mining on terrestrial wildlife species and their habitats in Idaho, followed by a more specific evaluation of the implications of each alternative to these resources, including TES species, management indicator species, and Idaho terrestrial species of greatest conservation need.

We do not discuss the potential impacts of activities that would not differ across alternatives or that are addressed through other planning efforts.

General Effects of Selected Management Activities

In this section, we present the effects that roads (their construction, reconstruction and maintenance), timber cutting, and discretionary mineral development could have on wildlife species and their habitats in Idaho.

Road Construction, Reconstruction, and Maintenance

National Forest System (NFS) roads are defined as those motor vehicles routes greater than 50 inches wide that are not managed as trails[2]. They may be temporary or permanent, varying in character and maintenance depending on their primary function. Temporary roads are most typically constructed of materials that allow for decommissioning (e.g., road closure and revegetation) following use (e.g., dirt). Permanent roads intended to facilitate long-term access into or through NFS lands may be constructed of native, onsite materials, gravel, or pavement. In Idaho, approximately 98% (33,398 miles) of all roads managed by the FS have substrates consisting of gravel (19%, 6583 miles) or native materials (e.g., dirt-80%, 26,815 miles) with paved roads (1%, 413 miles) constituting < 2 % of NFS roads (Bower 2007). Roads that facilitate high speed motorized travel (e.g., highways, freeways) do bisect NFS lands, although their maintenance typically does not fall under FS jurisdiction. Although we acknowledge the impacts these larger thoroughfares can have on wildlife populations, we focus the discussion and analysis on the nature of effects that result from roads managed under FS jurisdiction. Further, we do not include effects that could result from unauthorized roads on NFS lands, as they are outside the scope of this proposal.

[2] Actions related to management of unauthorized roads are addressed via the 2005 Travel Management Rule, and will not be discussed here.

The potential impacts of roads on terrestrial species and their habitats are well documented in the scientific literature. Based on several comprehensive syntheses on this topic (Wisdom et al. 2000, Trombulak and Frissell 2000, Forman et al. 2003, pg. 113-138), we organized our discussion of road effects under the following categories: habitat availability and effectiveness, habitat fragmentation, invasive species; and human access. We recognize that these categories are not mutually exclusive as they represent effects that can be difficult to tease apart from one another.

Habitat Availability and Effectiveness

Road construction, maintenance and use can directly and indirectly affect habitat availability within terrestrial ecosystems. First, construction and maintenance of roads can contribute to an immediate loss of habitat by removing pre-existing vegetation and altering the substrate (Forman et al. 2003, pg. 123). Because roads tend to be narrow, linear features, their contribution to habitat loss on a landscape scale may appear minimal. However, given the extent of the landscape that is roaded nationwide (Forman 2000), this loss should not be considered inconsequential to terrestrial species (Forman et al. 2003 pg. 123). In Idaho, roads managed under FS jurisdiction likely create a physical footprint covering approximately 26 square miles or 16,860 acres[3]. Logically, the impact of this direct loss of habitat may be more significant for species that are endemic, sedentary, and/or have small home ranges such as terrestrial mollusks, small mammals, and various invertebrates.

The indirect effects of roads on terrestrial species and their habitats extend well beyond the area of the actual road surface and thus have the potential to impact significantly larger areas than direct effects. Roads and the human activities they facilitate can displace wildlife species or cause them to avoid habitats that would otherwise be suitable. Where avoidance of a particular area is 100 percent, the effect equates to habitat loss as opposed to a decrease in habitat quality (Forman et al. 2003, pg. 124).

Terrestrial species that are larger in size, long-lived, and having substantial area requirements appear particularly vulnerable to this type of habitat loss (Forman et al. 2003, pg. 123). For example, available grizzly bear habitat in the Cabinet Mountains was reduced by as much as 28 percent because of road avoidance behavior by grizzly bears (Fredrick 1991). Female grizzly bears appear more sensitive to disturbance from roads in comparison to males in some cases (Gibeau et al. 2002). Gaines et al. (2005) found that the presence of roads reduced habitat effectiveness across all seasons for female black bears in the North Cascades Mountains of Washington. Whittington et al. (2004, 2005) monitored movements of collared wolves in relation to various landscape features, including roads. Results indicated avoidance by both monitored packs of areas characterized by high road and trail densities. There is some evidence to suggest that marten may use areas adjacent to forest roads less than interior habitats (Robitaille and Aubry 2000). However, Mowat (2006) did not detect selection against roads or logging in winter habitat associations of marten at a coarse scale. Although habitat use

[3] This is based on 33,398 miles of roads in Idaho on NFS lands that are at least 50 inches in width.

by lynx does not appear to be affected by the presence of logging roads, little is know about the impacts of increasing forest road densities within lynx habitat (Ruediger et al. 2000).

Reduced use of habitat in response to roads has also been exhibited in numerous ungulate species. For example, seasonal (summer and autumn) avoidance of roads by mule deer has been observed in more arid climates (Marshal et al. 2006). Woodland caribou can be displaced from important habitats like calving grounds (Joly et al 2006) due to their avoidance of roads (Dyer et al. 2002). Cole et al. (2004) documented increased use of open foraging habitats by elk within Road management areas when vehicular traffic was excluded for several years, suggesting human disturbance prior to vehicular exclusion may have precluded use by elk. Habitat effectiveness for deer and elk has been shown to decrease with increases in open road density in some areas (Thomas et al. 1979). Rowland et al. (2004) found that female elk in the Starkey Experimental Forest consistently used areas away from open roads in spring and summer, and that spatial distribution and distance to roads were more accurate predictors of habitat effectiveness than overall road density. The presence of poaching or hunting can exacerbate avoidance behavior and displacement of wildlife, particularly targeted species, from roads and adjacent areas. Such displacement can have implications for survival and recruitment where these areas are important for foraging and reproduction (Donadio and Buskirk 2006; Laurance et al. 2006).

Various avian species have also demonstrated sensitivity to the presence of roads. In selection of nest sites, some bird species, including bald eagles, golden eagles, and sandhill cranes, may avoid areas close to roads (Anthony and Isaacs 1989; Fernandez 1993; Norling et al. 1992). Lyon and Stanley (2003) noted that even light traffic (1-12 vehicles per day) on roads associated with natural gas development appeared to alter nesting behavior (nest initiation rates and movement from leks) of female sage grouse.

Fragmentation

Roads also contribute to changes in habitat quality and availability by fragmenting habitats in previously intact landscapes. As road densities increase, edge habitats increase and interior patches decrease, reducing habitat available to species requiring interior habitats. For example, Ortega and Capen (2002) noted that densities of forest-interior dwelling birds were significantly lower in forested areas adjacent to unpaved roads. As fragmentation increases, patches of remaining habitat may become sufficiently small in size and/or isolated to the point that they are no longer be used these wildlife species, thus resulting in effective habitat loss. This has been demonstrated in numerous species, including woodland caribou (Joly et al. 2006).

Ingelfinger and Stanley (2004) examined the responses of breeding song-birds to dirt and gravel roads associated with natural gas extraction in sagebrush steppe habitat. They found that densities of sagebrush obligates, particularly Brewer's and sage sparrows, were 39-60 percent lower within 100 m of roads than beyond this buffer. Although traffic volume could have contributed to avoidance of habitats adjacent to roads, authors suggested that these species could also have been responding to edge effects, fragmentation, and an increase in bird species typically found along roads. In areas where road densities are high, these effects can compound, having significant implications to local population dynamics.

In addition to changing configuration and availability of interior habitats, edges created by roads can alter environmental conditions within interior habitats bordering roads, such as microclimate (e.g., increased temperatures, humidity, exposure to direct sunlight, etc) and humidity (Chen et al. 1996; Chen et al. 1993). Such changes may make these areas less hospitable to particular species (Marsh and Beckman 2004).

Habitat can become inaccessible to species where roads function as a barrier to their movement. For example, studies cited by Trombulak and Frissell (2000) indicate that the land snail *arianta arbustorum* (Baur and Baur 1990) avoids even unpaved and narrow roads. Other examples are provided by Merriam et al. (1988), Swihart and Slade (1984), and Oxley and Fenton (1974), who found that some rodent species are reluctant to cross even the narrowest gravel roads. Similar results have been reported for herptiles such as turtles (Weatherhead and Prior 1992) and terrestrial salamanders (Marsh et al. 2005). Marsh et al. (2005) noted that forest roads, regardless of substrate (gravel versus paved), functioned as a partial barrier to terrestrial salamanders. This behavior can result in substantial amounts of suitable habitat being unavailable to these species.

Habitat loss can fragment populations into smaller subpopulations through loss of habitat connectivity (Shine et al. 2004), which can lead to demography fluctuations, inbreeding, loss of genetic variability, and local population extinctions (USDA Forest Service 2000c). Where roads function as barriers to movement, travel and dispersal, they can significantly alter population demographics and genetics of a species. Roads have been shown to act as barriers to gene flow in a common frog (*Rana temporaria*) and can lead to significant genetic differentiation among populations (Reh and Seitz 1990). Rico et al. (2007) found that whereas individual voles and mice were observed crossing narrow highways, wide highways served as complete barrier to movement, effectively separating populations on either side of the highway demographically.

Spread of Non-native Invasives

The construction of roads creates new edge habitat, and consequently, edge-dwelling species of plants, birds and animals can be introduced into forest environments, adversely affecting interior (forest and grassland) dwelling species. For example, building roads into or grasslands/prairie habitats (Patten et al. 2006) can lead to invasions by parasitic cowbirds, thus reducing resulting in decreased reproductive success in several passerine species (e.g., sparrows, blackbirds, meadowlarks).

Trombulak and Frissell (2000) cite studies by Wester and Juvik (1983), Henderson and Wells (1986), Tyser and Worley (1992) and Wein et al. (1992) showing that some non-native invasive plants establish themselves preferentially along roadsides and in other disturbed habitats. Roads serve as a means of entry for many non-native invasive plant species, with seeds or plant parts inadvertently transported into previously unaffected areas. Ground disturbance associated with roads and with other activities enabled by roads provides additional opportunity for establishment or expansion of non-native invasive plant populations (Parendes and Jones 2000). The establishment of these non-natives can lead to habitat loss, inter-specific competition, loss of quality forage, and lowered reproductive success for some wildlife species.

Human Access

Roads facilitate human access and activities that can contribute to habitat alteration and direct and indirect mortality of some animal species, including collisions and crushing. We focus primarily on species that are vulnerable to road mortality on those roads within the NFS jurisdiction – dirt, gravel, and paved. Although we acknowledge the role of freeways and highways on road mortality statistics, we do not discuss it in detail here. See the cumulative effects analysis for a discussion of these types of impacts to wildlife populations. As we have already discussed the range of effects that human disturbance can have on terrestrial wildlife species and their habitats, we do not repeat them here.

Large numbers of animals are killed annually on roads, including Forest Service roads. Amphibians may be especially vulnerable to roadkill because their life histories often involve migration between wetlands and uplands, and individuals are inconspicuous and sometimes slow moving. Further, some species of amphibians and reptiles tend to respond to road traffic by becoming immobile, which makes them more vulnerable to traffic-mortality than species that limit the amount of time spent on the road (Andrews and Gibbons 2005, Mazerolle et al. 2005). Reptiles seek roads for thermal cooling and heating, and experience substantial mortality from motorized vehicles (Vestjens 1973). In selected situations, such as for some amphibians and rodents with highly restricted home ranges, populations or rare animals may be reduced to dangerous sizes by road kills (USDA Forest Service 2000c). Kuitunen et al. (2003) hypothesized that decreased nest success of pied flycatchers along busy roads might be due to mortality of parent birds resulting from vehicle collisions.

Lastly, road maintenance can increase incidence of mortality resulting from collisions with vehicles for some species. For example, road salt used to de-ice roads under winter conditions can serve as attractants for some terrestrial species, like moose, thus increasing the likelihood of collisions with vehicles (Fraser and Thomas 1982, as cited in Forman et al. 2003, p. 217).

As mentioned above, roads allow people to access landscapes that would otherwise be difficult to reach. The presence of people and their activities can result in both direct and indirect impacts to wildlife species and their habitats. Some of these impacts are listed below.

- Loss of large trees, snags and logs in areas adjacent to roads through commercial harvest or firewood cutting has adverse effects on cavity dependent birds and mammals (Hann et al. 1997).

- Increased human access can contribute to great human ignitions of wildfire which can result in both habitat loss and degradation.
- Increased vulnerability to hunting and poaching –Sitka black-tailed deer and elk were more vulnerable to hunting mortality in landscapes accessible by roads (Farmer et al. 2006, Hayes et al. 2002). Roads facilitate poaching (Cole et al. 1997) of some large mammals, such as caribou, pronghorn, mountain goat, bighorn sheep, wolf, and grizzly bear (e.g., Dood et al. 1985, Knight et al. 1988, McLellan and Shackleton 1988, Mech 1970, Stelfox 1971, Yoakum 1978).
- Increased access for recreational shooting – Ground squirrels often are a target of recreational shooting, which is facilitated by human developments and road access (Ingles 1965). Many local endemic ground squirrels with small, isolated populations are vulnerable to recreational shooting facilitated by roads.
- Increased trapping of furbearers along roads (Hodgman et al 1994 and Thompson 1994, as cited in Wisdom et al. 2000).
- Negative wildlife-human interactions that could lead to increased mortality – Roads provide access for chronic, negative interactions between humans and wolves and grizzly bears (Mace et al. 1996, Mattson et al. 1992, Thiel 1985), increasing the probability of mortality of these species and often causing high-quality habitats near roads to serve as population sinks (Mattson et al. 1996, Mech 1973). Subadult grizzly bears are often found closer to high density roads than adults, making them more likely to encounter humans and thus increasing the vulnerability of this age-class to habituation and food-condition, both of which can result in destruction of animals (Mueller et al. 2004).

Temporary Roads and Reconstruction

Temporary roads present many of the same risks posed by permanent roads, although some are likely to be of shorter duration. Many temporary roads are designed based on lower standards than permanent roads, are typically not maintained to the same standards, and are associated with additional ground disturbance during their removal. Also, use of temporary roads to support timber harvest or other activities often involves construction of multiple roads over time, providing a more continuous disturbance to an area than a single, well-designed, maintained, and use-regulated road.

In addition to posing many of the same risks as road construction, road reconstruction could result in substantial changes in the kinds and amount of human uses in an area. Improvements such as realignment or improving road surfacing or gradient to provide easy access for low clearance vehicles may promote increases in the amount of human disturbances and disruptions to species and habitats, exceeding those previously experienced before reconstruction.

Benefits of Roads and Associated Activities to Terrestrial Species and Their Habitats

Some of the potential beneficial effects of road construction and timber harvest include:

- Enhanced access for some plant and wildlife management activities (e.g., census survey and collection, and structure maintenance);
- Easier access for habitat restoration and enhancement for some species using stand manipulation and vegetation management;
- Creation of edge habitat and early successional habitat used by some species;
- Easier access for hunting and wildlife viewing activities.

Collinge et al. (2005) suggested that roads may serve as barriers to plague-carrying hosts, which could reduce infection of prairie-dog colonies that are vulnerable to the disease. Such benefits, of course would need to be balanced by any increased mortality these colonies experience due to recreational shooting that could be facilitated by roads.

Summary

Almost all roads present some level of benefit and risk to terrestrial wildlife species. These effects can vary greatly in degree (USDA Forest Service 2000c), and can shift over time. Some effects are immediately apparent, but others may require external events, such as a large storm, to become visible. Still other effects may be subtle, such as increased susceptibility to invasion by nonnative species or pathogens noticed only when they become widespread in the landscape, or with increased road use as recreation styles and motor vehicles change (USDA Forest Service 2000c). A road-related beneficial effect for one species, may, in fact, represent an adverse effect for another. For example, although forest edges, such as those created by road construction and timber harvest, may benefit some species, such as deer and bobwhite quail, they also provide access to interior forest patches for opportunistic or predator species (Norse et al. 1986).

Although wildlife responses to habitat change and disturbance vary with species, individual, activity, and context, road-related impacts have been documented in a number of taxonomic groups, including ungulates (Cole et al. 2004, Joly et al. 2006, Marshal et al. 2006, Preisler et al. 2006), carnivores (Fredrick 1991, Ream and Mattson 1982, Gaines et al. 2005, Waller and Servheen 2005), reptiles (Shine et al. 2004, Andrews and Gibbons 2005), amphibians (Marsh et al. 2005), and birds (Anthony and Isaacs 1989, Stolen 2003).

Timber cutting/Vegetation Management

Timber cutting activities permitted in roadless areas under the three alternatives vary in degree from slashing in preparation for prescribed burns to commercial harvest that could remove large diameter trees. Timber cutting is defined here as any cutting of any trees for management purposes. Timber harvest is defined as the removal of trees for wood fiber use and other multiple-use purposes (USDA Forest Service, 2006). Timber cutting is a broader term, and encompasses timber harvest. Timber cutting, exclusive of timber harvest, could be used to support activities such as prescribe burning and timber stand improvement (Martin 2007). The trend in silvicultural practices is shifting away from traditional even-aged management to even-aged management with leave trees, two-aged management, and uneven-aged managed stands. From 2002 to 2006, clear-cutting on Idaho's National Forests accounted for only 7 percent of the total cutting method used on the 49.6 thousand acres harvested (USDA Forest Service, Intermountain & Northern Region data bases, 2007). In this section, we consider the effects of all of these management regimes on terrestrial wildlife species, although we recognize that even-aged management will be applied infrequently based on recent practices.

The effects of activities associated with timber cutting (e.g., tree felling, yarding, landings, site preparation by burning or scarification, fuels reduction, brush removal and whip felling, and forest regeneration) are often difficult to separate from the effects of roads and road construction. The road systems developed to cut/harvest timber are often a significant factor affecting terrestrial habitats, as discussed above. Further, the nature of effects resulting from timber cutting (i.e., habitat loss, degradation, and fragmentation, human disturbance) is similar to those created by roads, albeit different with respect to scale, configuration, and total area directly affected. To reduce redundancy, we focus this discussion on effects on terrestrial wildlife species attributed specifically to timber cutting and harvest.

Habitat Availability and Effectiveness

Timber cutting and harvest can alter habitat availability, configuration, and effectiveness for terrestrial wildlife species. The effects of uneven-aged management regimes, such as thinning, can have variable effects on animal communities, depending on the species. Hayes et al. (2003) found that thinning densely stocked conifer stands decreased detections of Hutton's vireos (*Vireo huttoni*), golden-crowned kinglets (*Regulus satrapa*), brown creepers (*Certhia americana*), blackthroated gray warblers (*Dendroica nigrescens*), and varied thrushes (*Ixoreus naevius*), but increased densities of American robins (*Turdus migratorius*), Townsend's solitaires (*Myadestes towizsendi*), and Hammond's flycatchers (*Empidonax hammondii*) western tanagers (*Piranga ludoviciana*), evening grosbeaks (*Coccothrazistes vespertinus*), and hairy woodpeckers (*Picoides villosus*). Patriquin and Barclay (2003) also documented differential responses of bats depending on species. For example, bat species that glean prey from surfaces did not forage in clear-cut plots whereas aerial foragers frequented areas along the forest edges.

Several studies have found that post-fire salvage logging reduces diversity and densities of cavity-nesting birds, such as the American three-toed (*Picoides dorsalis*) and black-backed woodpeckers (*P. arcticus*) (Hutto and Gallo 2006, Wesolowski et al. 2005). Decreases in primary cavity nesters may be due to a reduction in food availability (e.g., wood-boring beetle larvae) versus nest sites where sufficient snags are retained to support maximum densities of birds (Hutto and Gallo 2006).

Fragmentation

Research over the past two decades has shown that habitat edge is not benign to many species (Noss and Cooperrider 1994). In terrestrial ecosystems, the edge effect of timber harvest can extend substantial distances from the harvest area. Some timber harvest introduces new edge habitat, that influences air and soil temperature, wind velocity, radiation and soil and air moisture in the adjacent forest stands (Chen et al. 1995). Further, creation of edge due to harvest can result in the introduction of edge-dwelling species, such as parasitic cowbirds or non-native invasive plants, which can have detrimental effects on native, interior forest dwelling species (Baker and Lacki 1997, Robinson et al. 1995, Rosenberg et al. 1999). The establishment of these non-natives can lead to habitat loss, inter-specific competition, loss of quality forage, and lowered reproductive success for some plant and wildlife species (Trombulak and Frissell 2000).

As with roads, fragmentation from timber harvest can create travel barriers to some species, which may make substantial amounts of suitable habitat inaccessible. These travel barriers can fragment and isolate populations into smaller subpopulations causing demography fluctuations, inbreeding, loss of genetic variability, and local population extinctions. Amphibian species, because of their temporally and spatially dynamic populations, may be especially prone to local extinction resulting from human-caused fragmentation (Gibbs 1998). Many amphibian species are found in lower densities in some timber harvest areas when compared to mature, unmanaged forests (deMaynadier and Hunter, Jr. 1998, Petranka et al. 1993, Ash 1997, deMaynadier and Hunter, Jr. 1999). Factors identified as potential threats to the lynx included some types of timber harvest, fragmentation, and degradation that potentially reduced essential prey habitat (USDI Fish and Wildlife Service 1998c). Clearcuts greater than 100 m wide may create barriers to lynx movements (Ruggiero et al. 1994).

Beneficial Effects of Timber Cutting

Beneficial effects to terrestrial species from timber harvest activities are often due to creating or maintaining some specific habitat condition. Timber harvest creates forest age-class diversity and mosaic habitats used by some species (Wisdom et al. 2000, USDA et al. 2000c, Southern Appalachian Man and the Biosphere 1996c, USDA Forest Service 1995a, USDI Fish and Wildlife Service 1990, USDI Fish and Wildlife Service 1976). In fire-adapted ecosystems where fire suppression has altered composition and spatial distribution and configuration of openings, timber cutting can be a tool that can be used to improve the condition of these ecosystems.

Some species require early seral or open-forest habitats that can be created and maintained by properly planned, restorative timber harvest. Timber harvest activities may also reduce the risk of uncharacteristic large stand-replacing insect and disease outbreaks and severe wildland fires. These disturbance events, can present both benefits and risks to some species (Wisdom et al. 2000, USDI Fish and Wildlife Service 1995a, USDA et al. 1993), at least at a local level. Some examples of the potential beneficial effects of timber harvest include the following:

- The snowshoe hare, a primary lynx prey species, can benefit from properly planned regeneration harvests (USDA et al. 2000).
- Juvenile goshawks could benefit from forest management regimes that are designed to support abundant prey items while maintaining forest structural

conditions to allow juveniles to access prey within breeding areas (Wiens et al. 2006).
- Some species of bats appear to respond favorably to thinning in forested ecosystems (Loeb et al. 2002).
- Reynolds et al. (1991) suggest that active management activities like tree thinning may be beneficial in producing and maintaining the desired conditions for sustaining goshawks and their prey species.
- Mitchell and Powell (2003) noted that forest harvest can increase food resources for black bears, due to an increase in soft mast that is typically more limited in stands with significant overstory canopy. In terms of larger implications to black bear populations, one needs to consider the tradeoffs between the resources mature stands offer and the food resources harvested stands offer. Where food resources are not limiting, forest management will have limited impacts on populations.

Discretionary Mining

Roadless areas within Idaho contain salable, leasable, and locatable mineral resources. Locatable minerals, such as gold and silver, are subject to the General Mining Law of 1872 and are not discretionary. Because the proposed IRA alternatives do not seek to impose limits on activities related to locatable minerals, they will not be discussed further in this document. Further, removal of salable mineral resources (i.e. sand, stone, gravel, pumice, pumicite, cinders and clay) from IRAs is typically very limited due to a lack of commercial interest (Abing 2007). We focus this discussion of effect primarily on discretionary mining related to leasable minerals (e.g. oil, oil shale, gas, coal, phosphate, geothermal resources), as such activity could occur within IRAs and the management proposed for leasable minerals varies across the three alternatives.

Although it varies by commodity, surface use associated with the exploration and development of leasable minerals, requires access and haul roads, open pits, facilities, power lines, pipelines, and communication sites. For example, development of geothermal energy would include the following: exploratory drilling (some ground disturbance, road to access if not already there); if exploratory is favorable, construct well pad (about 3 acres); need power plant within one to two miles, pipelines which are above ground (Abing 2007). Mining operations associated with phosphate extraction can contribute to the following impacts on species (USDI and USDA 2006):

- Physical removal of habitat and increased disturbance to adjacent habitats;
- Increased uptake by wildlife of contaminants (e.g., selenium) in mining disturbance areas and areas that are reclaimed;
- Increased potential for road-related mortality of wildlife due to collisions and human access.

Generally, many of the impacts discretionary mining could have on terrestrial wildlife species will result from the habitat removal and required infrastructure, primarily road construction and development. The impacts resulting from these activities include habitat loss, degradation, fragmentation, and human disturbance, all of which are discussed in detail above.

Specific Effects of Management Activities on Terrestrial Wildlife Species in Idaho Roadless Areas

In this section, we present the risk of the selected management activities – road construction/reconstruction, timber cutting, and discretionary mining – to TES and MIS terrestrial wildlife species in Idaho. These estimates are based on an analysis presented in Appendix C, which consisted of the applying several analytical filters to each species and their habitats. First we determined the degree to the species might be *exposed* to the selected management activities (no, unlikely, possible, likely, yes). Exposure is a function of the species overlap with IRAs and the locations and habitat types management activities might be expected to occur within. Second, we consider the likelihood and intensity of species *response* to management activities. Lastly, we provide an estimate of the risk (low, moderate, high) to the species based on exposure and response. Determinations made at each juncture were based on scientific information presented in the previous section and analyses conducted as part of the Interior Columbia Basin Ecosystem Management Project (Wisdom et al. 2000), and the Idaho Comprehensive Wildlife Conservation Strategy (IDFG 2005), and the Smoky Canyon Mine DEIS (USDI and USDA 2006). Where information was lacking on particular species, we estimated possible effects based on responses of similar species or taxa

We summarize the risk levels for terrestrial species, including T, E, S, and MIS, below in Tables 31 and 32.

Table 31: Estimate of the risk that roads, timber cutting, and discretionary mining could pose to Threatened, Endangered, and Forest Sensitive species.

Species	Low	Moderate	High
Federally Threatened and Endangered			
Bald Eagle	X		
Canada lynx		X	
Gray wolf		X	
Grizzly Bear			X
Norther Idaho Ground Squirrel		Low-moderate	
Woodland Caribou		X	
Forest Service Sensitive			
American peregrine falcon	X		
Black swift	X		
Black-backed woodpecker			X
Boreal Owl		X	
Columbian sharp-tailed grouse		X	

Species	Low	Moderate	High
Common loon	X		
Fisher		X	
Flammulated owl			X
Fringed myotis	X		
Great gray owl		X	
Greater sage grouse		X	
Grizzly bear			X
Harlequin duck	X		
Marten		X	
Mountain plover	X?		
Mountain quail	X		
Northern bog lemming		X	
Northern goshawk		X	
Pygmy nuthatch		X	
Ring-necked snake	X		
Pygmy rabbit		Low-moderate	
Spotted bat	X		
Three-toed woodpecker			X
Townsend's big-eared bat		X	
Trumpeter swan	X		
White-headed woodpecker		X	
Wolverine		X	

Table 32: Estimate of the risk that roads, timber cutting, and discretionary mining could pose to select Management Indicator Species.

Species	Low	Moderate	High
Management Indicator Species not addressed above			
Belted kingfisher	X		
Downy woodpecker		X	
Elk		X	
Hairy woodpecker		X	
Moose		X	
Northern flicker	X		
Red squirrel	X		
Red-naped sapsucker	X		
White-tailed deer		Low-moderate	

In general, terrestrial species associated with open water systems, rocky cliffs, or mine shafts were categorized as a low risk for effect from selected management activities. These included primarily avian species: waterfowl, select raptors, and the black swift. Species most likely to be vulnerable to activities were typically associated with forested or grassland ecosystems that were likely to be impacted by roads, timber cutting, or discretionary mining. Cavity nesters, such as several of the woodpecker species and the flammulated owl ranked out as moderate-high risk due to the potential for timber cutting to remove or degrade important habitat components. The grizzly bear, due to the severity of impact (increased direct mortality) related to increased human-bear conflicts facilitated by roads also ranked out as a high risk. However, all activities occurring in grizzly bear habitat would likely be designed to meet recovery objectives.

EVALUATION OF THE ALTERNATIVES

Background

In this section, we examined the implications of each alternative to terrestrial species and their habitats within Idaho:

1) 2001 Roadless Rule. This alternative represents a roadless area management regime guided by the direction provided in the 2001 Roadless Rule.

2) Existing Forest Plans. This alternative represents an inventoried roadless area management regime guided by each forest's land and resource management plan as they would be implemented without the 2001 Roadless Rule.

3) Idaho Roadless Rule. This alternative represents an inventoried roadless area management regime guided by the direction provided in the Idaho Governor Risch petition to the United States Secretary of Agriculture (October 2006).

To facilitate a comparison across alternatives, the various management prescriptions for IRAs under the existing Forest Plans and the 2001 Roadless Rule were cross-walked with the Idaho State Roadless Alternative management themes. Our discussions under each alternative then refer to the relative protections these themes offer to wildlife resources. However, we acknowledge that there may not always be an exact correspondence between the prescriptions of the three Alternatives.

Table 33: Alternatives: Estimated Acres in Selected Management Themes

Alternatives	Wild Land Recreation	Primitive	SAHTS	Backcountr /Restoration	GRRG	Forest Plan Special Areas
2001 Roadless Rule				9,304,200		
Existing Plans	1,320,800	2,131,400	0	4,244,500	1,262,400	354,100
Idaho Roadless Rule	1,378,600	1,656,300	68,600	5,245,100	609,500	354,100

For all alternatives, we assume logistics associated with activities in IRAs will be constant. More specifically, land management activities in roadless areas often cost more to plan and implement than on other National Forest System lands (USDA Forest Service 2001). Typically these areas can be difficult to access or have not been the focus of past management and, therefore, have retained their roadless character. It is unlikely that the Idaho roadless areas will be the primary focus of future land management activities that involve road construction, road reconstruction, or timber cutting due to these logistical constraints. The possible exceptions to this generalization are areas that have a high priority for fuels treatment, and areas with leasable mineral resources, such as phosphate and geothermal. Past and projected future land management activities in the Idaho roadless areas have been and are expected to remain relatively low, which is reflected in the projected low amounts of permanent and temporary road construction and timber cutting for the alternatives.

2001 Roadless Rule

This alternative applies the strategy introduced by the 2001 Roadless Rule, the purpose of which was to ensure that roadless areas sustained their values for the current and future generations. Under the 2001 Roadless Rule, the following general conditions applied regarding selected management activities within IRAs (See Chapter 2 of DEIS for detailed description of this alternative):

- Road construction and reconstruction – prohibited except as provided in 7 exceptions that revolve around public health and safety (e.g., catastrophic events, CERCLA, etc.) prevention of irreparable resource damage, and existing rights or jurisdictions.
- Timber cutting – limited to four exceptions: for the purposes of conservation of TES species and ecosystem maintenance and restoration, where incidental to other activities that are not prohibited (including personal and administrative uses), and where roadless characteristics already have been compromised due to roads or timber harvest.
- Discretionary mining – minerals exploration and exploitation not directly prohibited, but the construction or reconstruction of roads associated with leases issued after January 12, 2001 was prohibited except where associated with reserved or outstanding rights, provided for by statue or treaty. Exploration or development of leasable minerals using existing roads or not requiring use of roads could still occur.

In general, management of IRAs under this alternative falls between the Primitive and Backcountry/Restoration themes described in the Idaho Roadless Rule. Under this alternative, construction of 0.8 mile of permanent road and 0.2 mile of temporary road per year is projected to take place (Table 34), all of which would be related to non-timber cutting activities such as access to rights-of-way, leasable minerals, and recreation (15 miles over a 15-year period).

Table 34: Projections of selected management activities

Projections for Selected Management Activities	2001 Roadless Rule	Existing Plans	Idaho State Roadless Petition
Road construction/ reconstruction – miles of road per year	1	12	4
Decommissioning – miles of road per year	1	4	3
Timber Cutting – acres per year	100	2,800	800

At this time, we can not predict exactly where road construction might take place. Construction of 1 mile of road per year equates to a physical footprint approximately .5 acres in size, or 7.5 acres over 15 years. As discussed earlier, the indirect effects of roads extend beyond the road prism, and have the potential to impact a much greater area. However, given the limited extent of road projected (one mile per year on average), the likelihood of negative impacts on any terrestrial wildlife species and their habitats resulting from road construction and reconstruction is exceptionally low. Rather, prohibitions on road construction/reconstruction in roadless areas will benefit most species, particularly species that have large home ranges, are sensitive to human disturbance, and/or that experience increased mortality due to increased human access facilitated by roads. Although all species listed under ESA within Idaho seek to benefit from prohibitions on road construction, the grizzly bear and woodland caribou will likely benefit most due to reduced disturbance and wildlife-human interactions that are facilitated by roads.

Based on information provided by each national forest in 2000, the current need for road construction or reconstruction within roadless areas for recovery or protection of threatened, endangered or sensitive species appears to be minimal. There was no reason to expect that this would change in the upcoming decades. It is unlikely that alternate means of access could not be found to accomplish recovery or conservation objectives, although costs may increase in some situations. With the exception provided under all of the prohibition alternatives that an existing road may be realigned to prevent irreparable resource damage, adverse effects to TEPS and other species caused by existing roads may be mitigated.

Roads can facilitate treatments that are designed specifically to improve habitats for other terrestrial wildlife, particularly game species such as mule deer, elk, wild turkey, upland birds, and black bear. However such treatments in IRAs, in the absence of revenues generated from associated timber harvest, are difficult to implement financially and thus infrequently proposed within IRAs.

The 2001 Roadless Rule prohibits timber cutting, sale, or removal except as provided in four exceptions. This alternative projects a very low amount of timber cutting in IRAs (about 1,500 acres over 15 years). Because of the exceptions and the intent to maintain roadless characteristics, the type of timber cutting in IRAs would be restricted to removal of small diameter materials and that maintains some structure and canopy. Such treatments, as opposed to even-aged management regimes, are less likely to fragment habitats.

With the added prohibition against non-stewardship timber cutting, this alternative presents a very low risk to terrestrial wildlife resources from habitat loss, degradation, and fragmentation resulting from timber cutting due to the limitations on the type and extent of change to existing vegetation. Further, other impacts to wildlife species from timber cutting activities, like disturbance, will be minimal.

The 2001 Roadless Rule does not address mineral resources except to limit road construction and reconstruction to reserved or outstanding rights, or as provided for by statute or treaty; or for the continuation, extension, or renewal of a mineral lease. Proposals for exploration or development of leasable minerals using existing roads or not requiring use of roads would be allowed within roadless areas. The prohibition of road construction or reconstruction severely limits the opportunity for exploration and essentially precludes development of presently undiscovered leasable mineral resources in IRAs. Under this alternative, there would be no new road construction/reconstruction within IRAs on the13,400 acres of unleased deposits within known phosphate lease areas on the Caribou National Forest (Abing 2007). Without the ability to construct or reconstruct roads, there would be no exploration activity on these lands and it is likely that new leases would not be issued and the phosphate reserves on this acreage would not be mined. Thus species likely to overlap with Known Phosphate Lease Areas such as the three-toed woodpecker, greater sage-grouse, sharp-tailed grouse, northern goshawk, and wolverine would benefit from such restrictions on development on the Caribou NF.

Summary of Effects – Generally, most terrestrial wildlife species will benefit from prohibitions on road construction/reconstruction, and timber cutting in IRAs as the adverse effects of these activities would be reduced. Limiting the ability to harvest timber for stewardship purposes except when needed for protection or recovery of TEP species or to restore/maintain ecosystem characteristics, may reduce the capability of the agency to enhance habitat directly and indirectly at the stand level, but it is unlikely to have much impact at larger scales. The agency's ability to use timber harvest to manage for early successional or other structural stages in some areas would be limited, although where such a need is identified, prescribed fire can be an effective tool under certain conditions.

No direct adverse environmental effects to terrestrial animal species or their habitat would be expected from the 2001 Roadless Rule, because it does not directly authorize any ground disturbing activities. Ground disturbing activities allowed under this alternative include very limited road construction/reconstruction and very limited timber cutting across the entire 9.3 million acres of IRAs. Overall, the effects on biodiversity would be beneficial. The Forest Service and other government agencies with jurisdictional responsibilities would retain the tools necessary to manage these resources.

T and E species determination for the 2001 Roadless Rule –

> May affect, but is not likely to adversely affect T and E species. Furthermore, the 2001 Roadless Rule may beneficially affect T and E species.

Sensitive species determination for the 2001 Roadless Rule –

> May affect individuals, but is not likely to cause a trend towards Federal listing or a loss of viability for any sensitive species. Furthermore, the 2001 Roadless Rule may beneficially affect sensitive species and their habitat.

MIS species under the 2001 Roadless Rule Alternative –

> No adverse affect to MIS on any of the National Forests within the analysis area. Furthermore, the 2001 Roadless Rule Alternative may beneficially affect MIS and their habitat.

Existing Forest Plans

Projected road construction and reconstruction in IRAs under existing Forest Plans (Existing Plans) is 12 miles per year, 180 miles over 15 years, equating to a physical footprint of approximately 90 acres. This estimate includes both permanent and temporary roads for timber cutting and non-timber related activities. The projected timber harvest is estimated to occur on 42,000 acres over 15 years, which could include both uneven-aged and even-aged management regimes. Management of leasable mineral resources in IRAs would be guided by each forest's land and resource management plan. The existing Caribou forest plan permits leasing of the estimated 6,500 acres of unleased Known Phosphate Lease Areas (KPLA) and/or other possible roadless areas that contain undiscovered phosphate resources. These known unleased phosphate deposits occur in six roadless areas (Dry Ridge, Huckleberry Basin, Meade Peak, Sage Creek, Schmid Peak, and Stump Creek) and would likely to be developed over an extended period of time (50 or more years). In addition, there are 6,900 acres of unleased phosphate deposits on the Targhee portion of the Caribou-Targhee National Forest within the bald Mountain, Bear Creek, and Poker Creek Roadless Areas. If these areas were to be leased at some time in the future, roads, pits, and other surface mining facilities would be expected to be constructed within the IRAs. An environmental analysis would have to be completed prior to exploration and development of these phosphate reserves.

Existing Plans may allow road construction/reconstruction for geothermal development in management prescriptions similar to Backcountry and General Forest Range Grassland (GFRG). It is unknown where and to what degree geothermal resources would be developed; however, since about half of the roadless areas have high to moderate potential, it is likely some development would eventually occur. Currently, lease applications have been submitted for geothermal exploration, which could affect about 7,000 acres of the Peace Rock Roadless Area on the Boise National Forest and 33 acres of the West Panther Roadless Area on the Salmon National Forest. If fully developed, roads, transmission lines, and other facilities would likely be constructed. Terrestrial species and their habitat would be considered during site-specific analysis and mitigations applied.

Approximately 39% of the 9.3 million acres of Idaho roadless areas are included in land-management plan prescriptions that are similar to the Wild Land Recreation and Primitive themes under the Idaho Roadless Rule, under which road construction, road reconstruction, and timber harvest is relatively restricted (Table 36). Timber cutting may be done on a very limited basis under the Primitive theme, and in response to a threat (e.g.,, insect and disease, windstorms, salvage). In general, the limitations on road construction and reconstruction, timber cutting and harvest, and discretionary mining under these management prescriptions will benefit most terrestrial wildlife species.

Under Existing Plans, approximately 4,244,500 acres of IRA would be subject to management similar to that under the Backcountry Restoration theme. Timber cutting and limited road construction could occur under this theme, albeit these activities would likely be limited to those necessary to improve ecosystem health or to address imminent threat of catastrophic wildfire. Thus there is the potential for terrestrial wildlife species to be impacted, particularly in forested habitats due to fuels reduction activities.. Removal of diseased, dead, and down materials could have negative impacts on primary cavity nesters, although existing snag retention requirements already included in most Forest Plans would assist in mitigating some of these effects.

The majority of road construction and timber cutting is anticipated to take place in areas managed as General Forest Rangelands, or Grassland. Approximately 1,262,400 acres of IRAs fall into this category. All Forests except the Challis NF and the Wallowa-Whitman NF have IRAs that include management under this theme. However, most acres categorized as GFRG fall on the Caribou, Idaho-Panhandle, Nez Perce, Salmon, and the Targhee National Forests. The terrestrial wildlife species found on these forests that are vulnerable to effects of roads, timber cutting, and discretionary mining, as discussed in the General Effects section could be differentially impacted under this theme.

Among federally listed species, the Canada lynx, gray wolf, grizzly bear in Northern Idaho, and woodland caribou could be at moderate to high risk of impact from these activities (Table 33). The likelihood that individuals of these species would encounter these activities or their effects is relatively low given less than 5.5 percent of their predicted distributions overlap at all with areas that would be managed as GFRG (see Appendix D) under this alternative. In addition, the Northern Rockies Lynx Amendment (USDA 2007) provides standards and guidelines to minimize adverse effects to lynx in occupied habitat that could result from roads, vegetation management and mining.

Of sensitive species that could be at moderate to high risk of impact (see Table 33) – black-back woodpecker, boreal owl, sharp-tailed grouse, fisher, flammulated owl, great gray owl, greater sage grouse, grizzly bear (Yellowstone population), marten, northern bog lemming, northern goshawk, pygmy nuthatch, three-toed woodpecker, Townsend's big-eared bat, white-headed woodpecker, and wolverine – none have predicted distributions that overlap General Forest Rangeland or Grassland by more than 5 percent (see Appendix D). Although some individuals could encounter activities and their impacts, the likelihood is relatively low.

Of management indicator species that could be at moderate to high risk of impact – downy woodpecker, elk, hairy woodpecker, and moose – none have predicted distributions that overlap General Forest areas by more than 5 percent (see Appendix D) and thus opportunities for impact are limited.

Because IRAs on the IPNF overlap a large number of species distributions, management activities that could take place in areas managed as GFRG have the potential to impact more species, and thus an area of high species richness, than on other Forests. The Salmon National Forest contains the most IRA acres under GFRG (about 404,300 acres) under this alternative but also ranked out as relatively low on species richness.

<u>Summary of Effects</u> – The Existing Plans will not directly result in adverse environmental effects on terrestrial species or their habitats because no ground-disturbing activities are directly authorized. However, the projected trend that road construction/reconstruction, timber cutting, and discretionary mineral activities would be highest under this alternative. Given the numerous negative direct and indirect effects to terrestrial wildlife species and their habitats identified in the literature associated with these activities, the Existing Plans Alternative has the greatest potential for increased risk of adverse effects to terrestrial animal species and terrestrial habitats.

T&E species determination for Existing Plans –

> Implementation of the Forest Plans Alternative is not likely to have any additional effects beyond those already consulted on for the existing Forest Plans.

Sensitive species determination for the Existing Plans –

> May affect individuals, but is not likely to cause a trend towards Federal listing or a loss of viability for any sensitive species.

MIS species under the Existing Plans –

> No adverse effect to MIS on any of the National Forests within the analysis area.

Mitigation measures offsetting some adverse effects would undoubtedly be identified as part of site-specific NEPA decisions and ESA consultations. However, some adverse effect, such as increased habitat fragmentation and loss of connectivity, cannot be effectively mitigated.

Idaho Roadless Rule

The Idaho Roadless Rule proposes 5 themes for the Idaho roadless areas. Each theme contains different restrictions and permissions (see Chapter 2 of the DEIS for a detailed description of the alternative themes). Of the five state Petition themes, the Wild Land Recreation and Primitive themes are the most restrictive because they only allow road construction, road reconstruction or timber cutting under very limited situations. Mineral activities are also very limited under these two themes. The Special Areas theme acres are to be managed under the primitive theme guidelines, except that there is an allowance for surface occupancy for geothermal would be precluded. Because of the prohibitions on ground disturbing activities within Wild Land Recreation and Primitive themes, these themes should provide for good conditions for terrestrial wildlife species and their habitats. These themes provide the best protection for terrestrial wildlife resources including TES and MIS species.

Approximately 5.25 million acres fall within the Backcountry Restoration theme which allows some road construction, road reconstruction, and timber cutting under seven exceptions. The allowances include all the permissions in the 2001 Roadless Rule with the addition of allowing activities necessary to perform expedited hazardous fuel treatment in Backcountry Restoration areas at significant risk of wildfire or insect/disease epidemics. Most new roads will be temporary, unless the responsible official determines that a permanent road meets the road exceptions and it will not substantially alter any of the roadless characteristics. Removal of diseased, dead, and down materials could have negative impacts on primary cavity nesters, although existing snag retention requirements already included in most Forest Plans would assist in mitigating some of these effects.

The General Forest Rangeland Grassland theme allows forests to manage these areas for road construction, road reconstruction, timber cutting and discretionary mineral activities except as addressed in the existing forest plans. The roadless characteristics and values in General Forest theme areas may not be maintained into the future. All of the forests, except for the Challis, Clearwater, Nez Perce, and the Wallowa-Whitman have acres proposed under the GFRG theme. The Caribou National Forest (~251,800) and the Targhee National Forest (~146,900) are proposing the most acres under this theme.

Among federally listed species, the Canada lynx, gray wolf, grizzly bear in Northern Idaho, and woodland caribou could be at moderate to high risk of impact from these activities (Table 31). The likelihood that individuals of these species would encounter these activities or their effects is relatively low given less than 2.5 percent of their predicted distributions overlap at all with areas that would be managed as General Forest, Rangelands, or Grassland under this alternative. In addition, the Northern Rockies Lynx Amendment provides standards and guidelines to minimize adverse effects to lynx in occupied habitat that could result from roads, vegetation management and mining.

Of sensitive species that could be at moderate to high risk of impact (see Table 31) – black-back woodpecker, boreal owl, sharp-tailed grouse, fisher, flammulated owl, great gray owl, greater sage grouse, grizzly bear (Yellowstone population), marten, northern bog lemming, northern goshawk, pygmy nuthatch, three-toed woodpecker, Townsend's big-eared bat, white-headed woodpecker, and wolverine – none have predicted distributions that overlap GFRG areas by more than 2.1 percent (see Appendix D). Although some individuals could encounter activities and their impacts, the likelihood is relatively low.

Of management indicator species that could be at moderate to high risk of impact – downy woodpecker, elk, hairy woodpecker, and moose – none have predicted distributions that overlap GFRG areas by more than 1.6 percent (see Appendix D) and thus opportunities for impact are limited.

The Idaho Roadless Rule would allow road construction/reconstruction and surface occupancy for phosphate exploration and development within the Backcountry and GFRG themes. There are 13,400 acres of known unleased phosphate deposits on the Caribou-Targhee National Forest. About 12,100 acres (90 percent) are located within the Backcountry and GFRG themes. Under these themes road construction or reconstruction would be permissible to develop these phosphate deposits. These deposits are located within nine roadless areas (Dry Ridge, Huckleberry Basin, Meade Peak, Sage Creek, Schmid Peak, and Stump Creek on the Caribou portion of the Caribou-Targhee National Forest; and Bald Mountain, Bear Creek, and Poker Creek on the Targhee portion of the forest) and could eventually be mined over an extended period of time (50 or more years). There is a potential risk to terrestrial species habitat on these 12,100 acres when and if this development should occur. Site-specific analysis would occur prior to any future leasing and mitigations applied.

About 1,300 acres of unleased phosphate deposits are in the Primitive theme. The Primitive theme prohibits road construction/reconstruction or surface occupancy for phosphates; therefore, this area would likely not be developed (see the Minerals section); and there would be no effect on terrestrial species found in this area.

The Idaho Roadless Rule would also permit road construction/reconstruction for geothermal development in the GFRG theme. About 7 percent of Idaho roadless areas are in this theme, and about 4 percent could be developed because of slope restrictions (see the Minerals section). It is likely some of these areas would be developed over time; however, except for two pending lease applications there is no information about where or when the activity would occur. If fully developed, roads, transmission lines, and other facilities would likely be constructed (see appendix I for a description of general development of geothermal resources). Site-specific analysis would occur prior to exploration or development of geothermal energy resources and would include consideration of terrestrial resources.

Currently lease applications have been submitted for geothermal exploration within 7,000 acres of the Peace Rock Roadless Area on the Boise National Forest and 33 acres of the West Panther Roadless Area on the Salmon National Forest. Both these areas are in either the Primitive or Backcountry theme; therefore, they would not be developed because of the inability to construct roads to access the area (see the Minerals section). No terrestrial resources would be affected in these areas.

<u>Summary of Effects</u> – IRAs in the Wild Land Recreation, Primitive, and Special Areas themes should be well protected from ground disturbing activities under this alternative because of the restricted permissions on activities related to road construction/reconstruction, timber cutting and discretionary minerals. These three themes should provide for natural processes, habitat integrity and species diversity. Areas proposed for the Backcountry Restoration theme have a higher risk of ground

disturbing activities (including road construction/reconstruction, timber cutting and discretionary minerals activities) occurring depending on future land uses and the risk of wildland fire. Areas proposed for the General Forest Rangeland and Grassland theme have the greatest potential for increased risk of adverse effects to terrestrial animal species and habitat, albeit most species have less than 3 percent of their predicted distributions that overlap with this theme.

T&E species determination for the Idaho Roadless Rule –

> Implementation of the Idaho Roadless Rule alternative is not likely to have any adverse effects on terrestrial wildlife species or habitats because the Rule does not directly authorize any ground-disturbing activities. The Idaho Roadless Rule Alternative may beneficially affect T&E species and their habitat in areas with the Wild Land Recreation, Primitive, or Special Areas themes.

Sensitive species determination for the Idaho Roadless Rule –

> Will not directly authorize ground-disturbing activities. Projects conducted later in time may affect individuals, but they are not likely to cause a trend towards Federal listing or a loss of viability for any sensitive species. The Idaho Roadless Rule may beneficially affect Forest Service Sensitive species and their habitat in areas with the Wild Land Recreation, Primitive, or Special Areas themes.

MIS species under the Idaho Roadless Rule –

> No adverse affect to MIS on any of the National Forests within the analysis area.

Cumulative Effects on Terrestrial and Aquatic Animal Species and Habitats

Cumulative effects are the "incremental effect of the action when added to other past, present, and reasonably foreseeable future actions" (40 CFR 1508.7).

Biological diversity or "biodiversity" refers to the variety and abundance of species, their genetic composition, and their communities (Wilson 1988).

This cumulative effects analysis is based on how factors within and outside of IRAs that could potentially affect terrestrial and aquatic animal species and habitats. Consideration was given to past, present and reasonably foreseeable future actions.

Non-Federal Habitat

There are about 52,961,000 acres of land in Idaho. NFS lands comprise about 20,464,000 acres. The Federal Government owns approximately 63% of all Idaho lands. The remaining 37% is in non-federal ownership. Because non-federal lands are a smaller percentage of all lands in Idaho they are often influenced by management on federal lands.

The role of non-federal lands in maintaining and recovering species and their habitats is not well defined. Idaho's current population of 1.3 million is expected to be 2 million by

2030 and much greater by 2100 (Idaho Department of Fish and Game 2005). The increased demands these individuals will place on the land will increase the value of the unroaded areas on federal land in the State to aquatic terrestrial and aquatic species. The higher resource demands placed on the land by a larger population will limit options for roadless areas to be established and protected in the future. In light of projected future population trends, the current inventoried roadless areas on federal lands can provide some of the best terrestrial and aquatic species habitat in Idaho into the future.

The Idaho Comprehensive Wildlife Conservation Strategy (2005) provides a foundation for sustaining Idaho's fish and wildlife and the habitats upon which they depend. The strategy provides general directions for wildlife conservation and a stimulus to engage partners in conservation of Idaho's wildlife resources. In addition, there are several species-specific recovery plans and conservation strategies for species occurring in Idaho, such as the Idaho Bull Trout Plan (Batt 1996). Several of the Tribal governments within Idaho have developed wildlife and fisheries conservation and restoration plans. Because of these efforts, terrestrial and aquatic habitats on non-federal land would in general remain stable or slightly improve over the long-term. Some lands may experience impacts to natural resources from urbanization and development, resource demands (e.g. minerals) and recreation. Some impacted conditions resulting in lower habitat quality on non-federal land may limit the potential effectiveness of habitat conservation and restoration on federal lands.

Non-Native Invasive Species

In 2003 Forest Service Chief Dale Bosworth identified invasive species as being one of the four significant threats to our Nation's forest and rangeland ecosystems. Invasive species have been characterized as a "catastrophic wildfire in slow motion" (USDA Forest Service 2004). Thousands of invasive plants, insects, fish, mollusks, crustaceans, pathogens, mammals, birds, reptiles, and amphibians have infested hundreds of millions of acres of land and water across the nation, causing massive disruptions in ecosystem function, reducing biodiversity, and degrading ecosystem health in the Nation's forests, prairies, mountains, wetlands, rivers, and oceans (USDA Forest Service 2004). The Forest Service has developed a National Strategy and Implementation Plan for Invasive Species Management (USDA Forest Service 2004) which sets the objective of protecting forest and rangeland ecosystems by preventing the release of non-native species and by controlling the spread, or eradicating, invasive species.

Non-native invasive species are a problem throughout Idaho. Current state activities and authorities address some invasive species, their prevention, and control (Idaho Invasive Species Council 2005). Of particular concern is that the presence or spread of invasive species could potentially limit the effectiveness of habitat improvements or efforts to recover species. Roads often provide vectors for spread of invasive species. In general, areas with fewer roads have a lower risk of having invasive species populations established.

Invasive species can threaten the diversity or abundance of native species. Invasive species often compete with native species that result in displacement of natives. Non-native fish species sometimes hybridize with native species resulting in reduced genetic purity. The widespread distribution of some exotic species within native fish habitat is problematic because resources are being taken away from the native fish by non-natives. The State of Idaho and the tribes have targeted eradication of some local populations of exotic fish species under their conservation plans. A key component to increase the effectiveness of habitat restoration and limit the spread of invasive species in Idaho is collaboration between federal and on-federal land owners.

Impacts of Existing Management Practices

Existing management practices within and outside of inventoried roadless areas have the potential to affect terrestrial and aquatic animal species and habitats. Land management activities such as timber harvest, road construction and maintenance, dams and diversions, livestock grazing, mining, and recreation can result in changes to vegetation composition and structure, success ional processes, nutrient cycling, water quality and quantity, and habitat complexity. Other human activities related to urbanization can have dramatic effects on terrestrial and aquatic species and habitats.

Effects to terrestrial and aquatic habitats from human activities tend to be chronic disturbances rather than episodic. Native species did not evolve with chronic disturbances such as continual sediment inputs to aquatic habitats from poorly maintained roads. Species did however evolve and adapt to sediment inputs from events such as landslides. Human caused impacts can be masked by natural disturbance processes such as flooding, fires and soil mass movements. However, it is important to recognize that native species evolved with natural disturbances processes and that they can often recover from these types of events, even when they appear to be catastrophic.

The Idaho IRAs provide areas where natural process can largely occur without human management influences. Information gained from these areas can help us to gain a better understanding of cumulative effects occurring elsewhere on the landscape and how these effects impact terrestrial and aquatic species and habitats.

Fire

For many aquatic ecosystems, fire has played an important role in creating and maintaining suitable habitat at varying temporal and spatial scales. Many species evolved under the influence of recurrent fire, including stand-replacing events, and their long-term persistence relies heavily on the maintenance of important habitat components by these kinds of disturbance events.

Mortality of fish and aquatic invertebrates from wildfires has been reported in a number of studies (Cushing and Olson 1963, Minshall et al.1997). According to Gresswell (1999), the cause of fire-related fish mortalities is generally associated with more intense and severe fires. Several studies have found that fire-induced changes in stream pH, ash extracts and smoke gases can be lethal to aquatic organisms (Cushing and Olson 1963, Spencer and Hauer 1991). In some cases, water temperature can apparently reach lethal levels. Minshall et al. (1989) found that fish mortality from lethal water temperatures, and chemical toxicity levels from smoke and ash were generally not associated with second and third-order streams.

Minshall and Brock (1991) reported dead salmonids in three small streams in Yellowstone following the fires of 1988, but the simultaneous occurrence of live fish in these streams suggests that mortality was not uniform or that surviving individuals migrated into these streams soon after the fire. Research on the Boise National Forest following large intense fires in 1992 showed rapid recolonization of Boise river stream reaches by bull trout and redband trout (Rieman et al. 1997). By 1995, fish densities were greater in the burned sections than in similar sections that did not burn. Research on recolonizaton of fish populations after large disturbance events or experimental removal indicates that full population recovery can occur quickly, frequently within a few years (Detenbeck et al. 1992, Niemi et al. 1990), or in appreciably shorter periods (Peterson and Bayley 1993, Sheldon and Meffe 1995).

Although Rieman et al. (1997) documented that large fires can adversely affect aquatic systems, and can result in fish mortality and even extirpation, they concluded that the resilience and persistence of salmonid populations are heavily influenced by the complexity and spatial diversity of habitats. A complex, well-dispersed network of habitats is likely to be an important element in the persistence of fish populations during and after large fires. They conclude that some aquatic species, such as bull trout and redband trout, appear to be well-adapted to “pulsed” disturbances such as fire and its associated hydrologic effects, as opposed to more continual or “press” effects linked to roads and extended timber harvest. They recommend that, where small or isolated sensitive fish populations occur in watersheds at high risk of uncharacteristic wildfire, management actions should be implemented only after careful site-specific evaluations of the risks.

Gresswell (1999) concluded that current evidence suggests that even in the case of extensive high-severity fires, local extirpation of fishes is patchy, and recolonization is rapid. Lasting detrimental effects on fish populations have been limited to areas where native fish populations have declined and become increasingly isolated because of anthropogenic activities. Burns (2000) found that risks to fish populations from fire, either prescribed or wildfire, are low where fish populations can freely migrate and ecosystems are not severely fragmented. Furthermore, Gresswell (1999) cites Warren and Liss (1980), Sedell et al. (1990), and Reiman et al. (1997) in concluding that native fishes have developed a complex variety of life history strategies that increase the probability of persistence during periods of environmental fluctuation. Even in cases where fish are extirpated, reinvasion is rapid if habitat connectivity is maintained.

Gresswell (1999) upon reviewing the literature on physical responses to fire in forested watersheds concluded that most temporally intermediate effects of fire on aquatic organisms are related to hydrologic change from increased water yield and sediment routing. Hydrologic processes control channel morphology, sediment composition and concentration, and recruitment and distribution of large woody debris.

Post-fire erosion effects on aquatic systems are often a primary concern. Some conclusions about post-fire erosion are described below (Everest et al. 1987, Gresswell 1999, Reeves et al. 1995, Swanston 1971, Swanston and Swanson 1976):

- Erosional effects are most extreme where the majority of vegetation and duff has been consumed by fire, soils are highly erosive, and large precipitation events occur after fire.
- In highly erosive or unstable landscapes in the west, 30% to 70 % of the long-term sediment yields occurred during and immediately following fires.
- In watersheds that are prone to erosion, the primary effect of a single fire may be a short-term alteration of hydrological and erosional processes.
- Postfire erosion events are important in maintaining long-term habitat complexity and suitable spawning and rearing habitats. Further more, because the proportion of a watershed that is burned influences the magnitude and extent of the postfire changes, smaller drainages in headwater areas often exhibit the greatest fire-related alterations.
- Anthropogenic activities could exacerbate the effects of natural events such as fire. In many cases, erosion at a watershed scale is more closely linked to timber harvest and road construction than fire.

At a landscape level, fires create and maintain habitat mosaics of different vegetation types (Mushinsky and Gibson 1991). These mosaics include various patch size, composition, and structure, as well as connectivity among patches. Smith (2000) identified the following landscape level fire effects on fauna: (1) changes availability of habitat patches and heterogeneity within them, (2) changes in the compositions and structures of larger areas, such as watersheds, which provide the spatial context for habitat patches, and (3) changes in connection among patches. During the course of post-fire succession, all three of these landscape features are in flux.

The ability of individual members of a species to survive the direct effects of fire depends on their mobility and on the uniformity, severity, size and duration of fire. While fires have the potential to injure and kill animals caught in their path (Bendell 1974, Singer and Schullery 1989), they generally kill and injure a relatively small proportion of animal populations (Smith 2000). Many adult vertebrate species are mobile enough to flee burning areas or seek refuge. The young of the year are often most vulnerable to injury and mortality from fire (Smith 2000).

Many amphibians live in mesic habitats that are likely to burn less often and less severely than upland sites (Smith 2000). Nevertheless, fire-caused changes in plant species composition and habitat structure (for example woody debris and down logs) and quantities of litter and woody material influence amphibian populations (Means and Campbell 1981, Russell et al. 1999, Smith 2000).

Factors Affecting Anadromous Fish

There are four anadromous fish species in Idaho: Snake River sockeye salmon (endangered), Snake River fall Chinook (threatened), Snake River spring/summer Chinook (threatened) and Snake River steelhead (threatened). Currently inventoried roadless areas in Idaho provide some of the best habitat and strongest populations of these fish. The complexity of the anadromous fish life cycle exposes them to many factors influencing their abundance. They begin life in the gravel of fresh water streams up to 900 miles inland and 6,500 feet above sea level. They travel downstream to the ocean, undergoing extraordinary metabolic changes on the way to adapt to salt water. After spending one to several years traveling hundreds of miles in the Pacific Ocean, they return to the place of their birth with striking fidelity. Once abundant and widespread, Snake River salmon of natural origin are now reduced to a small fraction of their former numbers and have lost major portions of their former habitat.

Human activities on federal and non-federal lands including hydropower, hatcheries, harvest and land management such as road building, grazing and recreation have altered anadromous fish environments leading to widespread declines (USDA and USDI 2000a, USDA and USDI 2000b). Inventoried roadless areas are key to recovery of salmon and steelhead stocks in decline, providing habitat to protect species until longer-term solutions can be developed for migration, passage, hatchery, and harvest problems associated with the decline of anadromous fish (USDA Forest Service 2001). Maintaining current populations and future recovery of anadromous species in Idaho will depend on reducing mortality from a variety of factors.

NOAA Fisheries, in partnership with Idaho's Office of Species Conservation, is beginning to draft Idaho's portion of the Snake River Salmon and Steelhead Recovery Plan. This plan is scheduled to be completed in 2007.

Climate Change/Global Warming

Climate change and global warming are affecting terrestrial and aquatic animal species and habitats in Idaho. Average annual temperature increases due to increased CO_2 are affecting snowpack, peak runoff and base flows of stream and rivers. Spring snowpack will probably be less, and more precipitation will probably fall as rain versus snow. Spring peak runoff will be earlier.

Changes due to climate change and global warming could be compounded considerably in combination with other disturbances such as fire. Larger climate driven fires can be expected in Idaho in the future.

Climate change is also affecting phenology (the biology of timing of organisms) involving things like hibernation and migration of animals. In addition, for species such as bull trout that require colder water temperatures to survive and reproduce, warmer temperatures could lead to significant decreases in available suitable habitat.

Biodiversity

Based on current literature (Flather et al. 1999; Noss and Cooperrider 1994; Stein et al. 2000) it is possible to conclude that with or without conservation of inventoried roadless areas, biodiversity is at an increased risk of adverse cumulative effects from increased population growth and associated land uses, land conversions, and nonnative species invasions. Maintenance of inventoried roadless areas characteristics, however, may lessen this risk at least in the short term (20 years). By reducing the level of potential adverse impacts on inventoried roadless areas, some of the last relatively undisturbed large blocks of land outside of designated Wilderness that contribute to species biodiversity would be conserved.

Conservation of inventoried roadless areas characteristics could have beneficial effects on biodiversity conservation at the local, regional, National Forest System, and national levels. There would be similar incremental beneficial effects on biodiversity conservation when any of the IRA prohibitions is combined with the past, present, and reasonably foreseeable land uses and conversions, laws, regulations, policies, and non-native species invasions. The local, regional, and national cumulative beneficial effects to TES species and biodiversity could include:

- Conserving and protecting large contiguous blocks of habitat that provide habitat connectivity and biological strongholds for a variety of terrestrial and aquatic plant and animal species including TES species.
- Providing important local and regional components of conservation strategies for protection and recovery of listed TES species.
- Providing increased assurances that biological diversity would be conserved at a landscape level, including increased area of ecoregions protected, improved elevational distribution of protected areas, decreased risk of additional timber harvest and road caused fragmentation, and maintenance and restoration of some natural disturbance processes.
- Providing increased assurance that biodiversity would be supported within inventoried roadless areas including the maintenance of native plant and animal communities where nonnative species are currently rare, uncommon, or absent.

The value of inventoried roadless areas in conserving biodiversity is likely to increase as habitat loss and habitat degradation increase in scope and magnitude. With these increasing trends, the importance of roadless area conservation and other laws, regulations, and policies in the management of biodiversity is also likely to increase.

The IRAs when considered alone may not be as important as when considered in combination with other land conservation laws, policies, and strategies. For example, many inventoried roadless areas in combination with Wilderness Areas, Nature Conservancy Preserves, some National Forest System land allocations, National Parks, or conservation easements provide large contiguous habitat blocks with national significance for biodiversity conservation.

Whether the cumulative beneficial effects of the prohibitions and other past, present and reasonably foreseeable actions would fully offset predicted future increases in land uses, land conversions, and nonnative species invasions is difficult to assess. Yet, it is possible to conclude that without the prohibitions, there would likely be an increased risk of adverse cumulative effects to biodiversity.

At some point in the future, projected habitat loss and degradation from the direct and indirect effects of increasing population growth could potentially surpass the contribution of inventoried roadless areas to biodiversity conservation. Under this scenario, habitat loss and the loss of viable plant and animal populations may be of a magnitude such that the beneficial effects of the prohibitions and other laws, regulations, and policies relative to biodiversity conservation may be lost or overwhelmed. Even in these circumstances, inventoried roadless areas would still likely convey some beneficial effects relative to conservation of individual TES species locally, regionally, and nationally.

Conclusions on Cumulative Effects by Alternative

As population growth and associated land uses and land conversions place pressures on both NFS and non-NFS lands, the value and importance of inventoried roadless areas in conserving biological diversity will probably increase. In the future, habitat loss and loss of viable animal populations may be of a magnitude such that the beneficial effects of the prohibitions, and other laws, regulations and policies relative to the conservation of native biodiversity may be lost or overwhelmed. Even under this scenario, inventoried roadless areas would likely still convey some beneficial effects relative to conservation of terrestrial and aquatic animal species and habitat in Idaho.

2001 Roadless Rule Alternative

Overall, the 2001 Roadless Rule Alternative when considered with the effects of land uses, land conversions, laws, regulations and policies, and nonnative species invasions would be beneficial to biological diversity, including species habitats, populations and landscape diversity. Some of the potential beneficial effects include:

- Protected large contiguous blocks of habitat providing habitat connectivity for a variety of species that need large connected landscapes;
- Decreased risk associated with fragmentation and isolation from timber cutting, road construction/reconstruction and discretionary minerals activities;
- Conserving and protecting biological strongholds and other important habitats for terrestrial and aquatic animals, including TES species;
- Decreased risk associated with invasive species introductions and spread;
- Maintaining native animal communities where non-native-species are currently rare, uncommon or absent;

- Providing increased assurances that biological diversity would be conserved, both within the area and the overall landscape in which it is found;
- Providing important components of conservation strategies for protection and recovery of federally listed proposed, threatened, endangered, and NFS Regional Forester sensitive species; and
- Maintaining or restoring some level of natural disturbance processes at a local level and landscape levels, which are important controls for ecosystem composition, structure, and function.

Existing Land and Resource Management Plans Alternative

Because of the permissions provided in the Existing Land and Resource Managements Plans Alternative, when considered with the effects of land uses, land conversions, laws, regulations and policies, and nonnative species invasions it would probably not be sufficient to provide for biological diversity, including species habitats, populations and landscape diversity into the future. This assessment was based largely on the following cumulative effects:

- The projected increasing trends in population growth, deleterious land uses, land conversion and non-native species invasion are likely to contribute to increased risks to biodiversity.
- It is likely that Federal, State, local and private land laws, regulations and policies will become more pivotal in conserving biodiversity. However, future laws, policies, and regulations could de-emphasize land conservation in the interest of meeting future social and economic values, thus placing biodiversity at risk.
- Climate changes may lead to less favorable habitat availability for some TES species leading to more restricted ranges and some local extirpations of populations.

Idaho Roadless Rule Alternative

The Idaho Roadless Rule Alternative when considered with the effects of land uses, land conversions, laws, regulations and policies, and nonnative species invasions would be beneficial to biological diversity, including species habitats, populations and landscape diversity for the same reasons listed above under the 2001 Roadless Rule Alternative.

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Appendix A: Idaho roadless areas that Overlap Aquatic Threatened and Endangered Species Ranges

Forest	Idaho Roadless Area	Forest	Idaho Roadless Area
Boise	Bald Mountain 019	Boise	Sheep Creek
Boise	Bear Wallow	Boise	Steel Mountain
Boise	Bernard	Boise	Stony Meadows
Boise	Black Lake	Boise	Ten Mile/Black Warrior
Boise	Breadwinner	Boise	Tennessee
Boise	Burnt Log	Boise	Whiskey
Boise	Cathedral Rocks	Boise	Whiskey Jack
Boise	Cow Creek	Boise	Whitehawk Mountain
Boise	Danskin	Boise/Challis	Blue Bunch
Boise	Deadwood	Boise/Challis	Red Mountain 916
Boise	Elk Creek	Boise/Challis/Sawtooth	Hanson Lakes
Boise	Grand Mountain	Boise/Payette	Caton Lake
Boise	Grimes Pass	Boise/Payette	Horse Heaven
Boise	Hawley Mountain	Boise/Payette	Meadow Creek
Boise	House Mountain	Boise/Payette	Needles
Boise	Lost Man Creek	Boise/Payette	Poison Creek
Boise	Nameless Creek	Boise/Payette	Snowbank
Boise	Peace Rock	Boise/Sawtooth	Lime Creek
Boise	Poker Meadows	Boise/Sawtooth	Smoky Mountains
Boise	Rainbow		
Boise	Reeves Creek		
Challis	Borah Peak	Idaho Panhandle	Grandmother Mountain
Challis	Challis Creek	Idaho Panhandle	Hammond Creek
Challis	Greylock	Idaho Panhandle	Kootenai Peak
Challis	Grouse Peak	Idaho Panhandle	Little Grass Mountain
Challis	Jumpoff Mountain	Idaho Panhandle	Magee
Challis	Warm Creek	Idaho Panhandle	Midget Peak
Challis	King Mountain	Idaho Panhandle	Mosquito-Fly
Challis	Pahsimeroi Mountain	Idaho Panhandle	Katka Peak
Challis	Red Hill	Idaho Panhandle	North Fork
Challis	Seafoam	Idaho Panhandle	Packsaddle
Challis	Spring Basin	Idaho Panhandle	Pinchot Butte
Challis	Squaw Creek	Idaho Panhandle	Mt. Willard-Lake Estelle
Challis	Wood Canyon	Idaho Panhandle	Roberts
Challis/Sawtooth	Boulder-White Clouds	Idaho Panhandle	Saddle Mountain
Challis/Sawtooth	Loon Creek	Idaho Panhandle	Salmo-Priest
Challis/Sawtooth	Railroad Ridge	Idaho Panhandle	Schafer Peak

Forest	Idaho Roadless Area	Forest	Idaho Roadless Area
Challis/Targhee	Diamond Peak	Idaho Panhandle	Scotchman Peaks
Clearwater	Bighorn - Weitas	Idaho Panhandle	Selkirk
Clearwater	Eldorado Creek	Idaho Panhandle	Sheep Mountain-State Line
Clearwater	Hoodoo	Idaho Panhandle	Storm Creek
Clearwater	Lochsa Face	Idaho Panhandle	Trestle Peak
Clearwater	Lolo Creek (LNF)	Idaho Panhandle	Upper Priest
Clearwater	Moose Mountain	Idaho Panhandle	West Fork Elk
Clearwater	North Fork Spruce - White Sand	Idaho Panhandle	White Mountain
Clearwater	North Lochsa Slope	Nez Perce	Clear Creek
Clearwater	Pot Mountain	Nez Perce	Dixie Summit - Nut Hill
Clearwater	Rawhide	Nez Perce	East Meadow Creek
Clearwater	Siwash	Nez Perce	Gospel Hump
Clearwater	Sneakfoot Meadows	Nez Perce	Gospel Hump Adjacent to Wilderness
Clearwater	Weir - Post Office Creek	Nez Perce	John Day
Clearwater/Idaho Panhandle	Mallard-Larkins	Nez Perce	Lick Point
Clearwater/Idaho Panhandle	Meadow Creek - Upper North Fork	Nez Perce	Little Slate Creek
Clearwater/Nez Perce	Rackliff - Gedney	Nez Perce	Little Slate Creek North
Idaho Panhandle	Beetop	Nez Perce	Mallard
Idaho Panhandle	Big Creek	Nez Perce	North Fork Slate Creek
Idaho Panhandle	Blacktail Mountain #122	Nez Perce	O'Hara - Falls Creek
Idaho Panhandle	Buckhorn Ridge	Nez Perce	Salmon Face
Idaho Panhandle	Continental Mountain	Nez Perce	Silver Creek - Pilot Knob
Idaho Panhandle	East Cathedral Peak		
Nez Perce	West Fork Crooked River - NEW	Salmon	Jesse Creek
Nez Perce	West Meadow Creek	Salmon	Jureano
Nez Perce/Payette	Rapid River	Salmon	Little Horse
Payette	Big Creek Fringe	Salmon	Long Tom
Payette	Chimney Rock	Salmon	McEleny
Payette	Cottontail Point/Pilot Peak	Salmon	Musgrove
Payette	Council Mountain	Salmon	Napias
Payette	Crystal Mountain	Salmon	Napoleon Ridge
Payette	Cuddy Mountain	Salmon	Oreana
Payette	French Creek	Salmon	Perreau Creek
Payette	Hells Canyon/7 Devils Scenic	Salmon	Phelan
Payette	Indian Creek	Salmon	Sal Mountain
Payette	Patrick Butte	Salmon	Sheepeater
Payette	Secesh	Salmon	South Deep Creek
Payette	Smith Creek	Salmon	South Panther
Payette	Sugar Mountain	Salmon	West Big Hole

Forest	Idaho Roadless Area	Forest	Idaho Roadless Area
Payette	Placer Creek	Salmon	West Panther Creek
Salmon	Ageny Creek	Salmon/Challis	Lemhi Range
Salmon	Allan Mountain	Salmon/Challis	Taylor Mountain
Salmon	Anderson Mountain	Salmon/Targhee	Italian Peak
Salmon	Blue Joint Mountain	Sawtooth	Buttercup Mountain
Salmon	Deep Creek 509	Sawtooth	Elk Ridge
Salmon	Duck Peak	Sawtooth	Huckleberry
Salmon	Goat Mountain	Sawtooth	Liberal Mountain
Salmon	Goldbug Ridge	Sawtooth	Pettit
Salmon	Haystack Mountain	Wallowa-Whitman	Big Canyon Id
		Wallowa-Whitman	Klopton Creek - Corral Ck

Appendix B: Idaho Roadless Areas that Overlap Aquatic Sensitive Species Ranges and the Number of Aquatic Sensitive Species within each Idaho Roadless Area Identified.

IRA Name	# Sp	IRA Name	# Sp	IRA Name	# Sp
Agency Creek	3	Indian Creek	2	Sage Creek	2
Allan Mountain	4	Italian Peak	4	Sal Mountain	4
Anderson Mountain	4	Jesse Creek	4	Salmon Face	3
Bald Mountain 019	2	John Day	5	Salmo-Priest	3
Bald Mountain 614	3	Jumpoff Mountain	2	Schafer Peak	5
Bear Creek	2	Jureano	4	Schmid Peak	2
Bear Wallow	3	Katka Peak	6	Scotchman Peaks	4
Beetop	4	King Mountain	2	Scout Mountain	2
Bernard	4	Klopton Cr. - Corral Cr. Id	5	Seafoam	4
Big Canyon Id	4	Kootenai Peak	6	Secesh	4
Big Creek	4	Lemhi Range	4	Selkirk	6
Big Creek Fringe	4	Liberal Mountain	4	Sheep Creek	3
Bighorn - Weitas	7	Liberty Creek	2	Sheep Gulch	2
Black Lake	4	Lick Point	6	Sheep Mountain-State Line	4
Black Pine	2	Lime Creek	4	Sheepeater	5
Blackhorse Creek	2	Lionhead	3	Sherman Peak	2
Blacktail Mountain #122	3	Little Grass Mountain	3	Silver Creek - Pilot Knob	7
Blacktail Mountain #161	5	Little Horse	4	Siwash	5
Blue Bunch	4	Little Slate Creek	4	Skitwish Ridge	4
Blue Joint Mountain	3	Little Slate Creek North	4	Smith Creek	4
Bonneville Peak	2	Lochsa Face	7	Smoky Mountains	5
Borah Peak	3	Lolo Creek (LNF)	5	Sneakfoot Meadows	6
Boulder-White Clouds	5	Lone Cedar	1	Snowbank	3
Breadwinner	3	Long Tom	5	Soda Point	2
Buckhorn Ridge	4	Loon Creek	4	South Deep Creek	4
Burnt Log	4	Lost Creek	4	South Panther	4
Buttercup Mountain	4	Lost Man Creek	3	Spion Kop	4
Cache Peak	2	Magee	4	Spring Basin	4
Camas Creek	4	Mahogany Butte	3	Squaw Creek	4
Caribou City	3	Mallard	6	Station Creek	2
Cathedral Rocks	3	Mallard-Larkins	5	Stauffer Creek	2
Caton Lake	4	Maple Peak	4	Steel Mountain	3
Challis Creek	4	Mceleny	4	Stevens Peak	4
Chimney Rock	4	Meade Peak	3	Stony Meadows	4
Clarkston Mountain	2	Meadow Creek	4	Storm Creek	4
Clear Creek	6	Meadow Creek - Upper North Fork	5	Stump Creek	2

IRA Name	# Sp	IRA Name	# Sp	IRA Name	# Sp
Cold Springs	2	Midget Peak	4	Sugar Mountain	3
Continental Mountain	3	Mink Creek	2	Swan Creek	2
Copper Basin	2	Moose Mountain	5	Taylor Mountain	4
Cottontail Point/Pilot Peak	5	Mosquito-Fly	4	Telephone Draw	2
Cottonwood	2	Mount Harrison	2	Ten Mile/Black Warrior	3
Council Mountain	3	Mount Naomi	1	Tennessee	3
Cow Creek	3	Mt Heinen	3	Tepee Creek	4
Crystal Mountain	4	Mt. Jefferson	3	Third Fork Rock Creek	2
Cuddy Mountain	3	Mt. Willard-Lake Estelle	6	Thorobred	3
Danskin	3	Musgrove	4	Toponce	2
Deadwood	3	Nameless Creek	4	Trestle Peak	4
Deep Creek 158	2	Napias	5	Trouble Creek	4
Deep Creek 509	4	Napoleon Ridge	5	Trout Creek	4
Diamond Peak	2	Needles	4	Two Top	4
Dixie Summit - Nut Hill	5	North Fork	4	Upper Priest	3
Dry Ridge	3	North Fork Slate Creek	6	Warm Creek	1
Duck Peak	5	North Fork Spruce - White Sand	6	Weir - Post Office Creek	7
East Cathedral Peak	4	North Lochsa Slope	7	West Big Hole	4
East Fork Elk	4	North Pebble	2	West Fork Crooked River - NEW	5
East Meadow Creek	6	O'Hara - Falls Creek	7	West Fork Elk	4
Eldorado Creek	6	Oreana	4	West Meadow Creek	7
Elk Creek	4	Oxford Mountain	3	West Mink	2
Elk Ridge	4	Packsaddle	4	West Panther Creek	4
Elkhorn Mountain	3	Pahsimeroi Mountain	4	West Slope Tetons	3
Fifth Fork Rock Creek	3	Palisades	3	Whiskey	4
French Creek	4	Paris Peak	2	Whiskey Jack	3
Gannett-Spring Creek	3	Patrick Butte	5	White Knob	2
Garfield Mountain	3	Peace Rock	4	White Mountain	5
Garns Mountain	3	Perreau Creek	4	Whitehawk Mountain	4
Gibson	2	Pettit	4	Williams Creek	2
Gilt Edge-Silver Creek	4	Phelan	4	Wilson Peak	3
Goat Mountain	4	Pinchot Butte	2	Winegar Hole	3
Goldbug Ridge	4	Pioneer Mountains	4	Wonderful Peak	4
Gospel Hump	5	Placer Creek	4	Wood Canyon	2
Gospel Hump Adjacent to Wilderness	5	Poison Creek	3	Worm Creek	2
Graham Coal	4	Poker Meadows	3		
Grand Mountain	3	Poker Peak	3		
Grandmother Mountain	5	Pole Creek	2		
Greylock	4	Pot Mountain	5		

IRA Name	# Sp	IRA Name	# Sp	IRA Name	# Sp
Grimes Pass	3	Prophyry Peak	2		
Grouse Peak	4	Rackliff - Gedney	7		
Hammond Creek	4	Railroad Ridge	4		
Hanson Lakes	4	Rainbow	3		
Hawley Mountain	3	Rapid River	4		
Haystack Mountain	5	Rawhide	5		
Hell Hole	2	Raynolds Pass	3		
Hellroaring	4	Red Hill	2		
Hells Canyon/7 Devils Scenic	3	Red Mountain 916	4		
Hoodoo	6	Red Mountain 170	3		
Horse Heaven	4	Reeves Creek	4		
House Mountain	3	Roberts	4		
Huckleberry	4	Roland Point	4		
Huckleberry Basin	1	Saddle Mountain	6		

Appendix C: Application of Analytical Filters on Federally listed, Forest Sensitive, and MIS species.

In this appendix, we evaluated the risk of the selected management activities – road construction/reconstruction, timber cutting, and discretionary mining – to TES and MIS terrestrial wildlife species in Idaho. A summary of this Appendix is included in the Specialist Report and Biological Evaluation for Aquatic and Terrestrial Habitats and Species. This evaluation consisted of the applying several analytical filters to each species and their habitats.

1. We estimated the degree to the species might be *exposed* to the selected management activities (unlikely, possible, likely). Exposure is a function of the species overlap with IRAs and the locations and habitat types management activities might be expected to occur within. Granted, we can not predict exactly where particular management will take place. However, exposure for any given species could be unlikely if its distribution is limited in IRAs and/or if it occurs in habitats that will not be subject to management activities. Exposure could be likely if the species is relatively ubiquitous, highly mobile, and/or a habitat generalist.
2. We considered the severity (high, medium, low) and likelihood (unlikely, possible, likely) of each species *response* to management activities assuming exposure occurs. This filter incorporates the nature of the impact on the species (e.g., mortality, habitat loss, disturbance) and the likelihood that such an effect could occur given there was exposure.
3. Lastly, we provide an estimate of the risk (low, moderate, high) to the species based on exposure and response.

Determinations made at each juncture were based on current scientific information and analyses conducted as part of the Interior Columbia Basin Ecosystem Management Project (Wisdom et al. 2000), and the Idaho Comprehensive Wildlife Conservation Strategy (IDFG 2005), and the Smoky Canyon Mine DEIS (USDI and USDA 2006). Where information was lacking on particular species, we estimated possible effects based on responses of similar species or taxa.

<u>Where management activities could occur</u>

Construction of roads is typically an interrelated activity that is needed to facilitate other activities, such as timber cutting and discretionary mining. Timber cutting, which include timber harvest, may be proposed to reduce fuels, improve forested conditions and/or to remove a merchantable product. Based on an evaluation of the condition of forested communities within Idaho, silvicultural treatments to improve stand conditions might target the following forest cover types (see USDA 2007, Vegetation specialist report): Douglas-fir (root disease, bark beetle, spruce budworm), lodgepole pine (mountain pine beetle), whitebark pine (white pine blister rust, mountain pine beetle), grand fir (bark beetle, spruce budworm), subalpine fir (spruce budworm, bark beetle). Most forest cover types could be the target of timber harvest activities due to their commercial value, however it is not possible to estimate exactly where these activities would occur across the state.

Approximately 50% of acres overlapping IRAs have high geothermal potential. At this time it is difficult to estimate exactly where development of geothermal energy might take place although specific locations would be restricted to sites with less than a 40% slope (USDA 2007 – Minerals specialist report. Oil and gas prospects appear very limited, likely to only occur on the Caribou-Targhee NF. Known phosphate lease areas are also restricted to the Caribou-Targhee NF. Known Phosphate Lease Areas (KPLA) are those areas that are known to contain phosphate deposits but are currently unleased. KPLAs overlap 13,440 acres on 9 IRAs on the Caribou-Targhee NF, most of which are within the Huckleberry Basin (1,400 acres), Meade Peak (2,500 acres) and Sage Creek (1,700 acres), Bald Mountain (1,400 acres), and Bear Creek (5,100 acres) IRAS. Based on the locations of existing phosphate leases, KPLAS are likely to include the following habitat types on the Caribou NF (USDI and USDA 2006): mixed conifer (e.g., Douglas-fir, subalpine fir) and aspen forests, mixed forest/brush, sagebrush habitat, and riparian/wet meadow habitats.

Tables C1, C2, and C3, report the findings of our analysis for Federally Threatened and Endangered Species, Forest Sensitive Species, and Management Indicator species, respectively. These findings do not indicate levels of risk to the species under any given alternative. Rather, they provide an overall level of risk to the species that various management activities could have based on the species.

Table C-1 FEDERALLY THREATENED AND ENDANGERED SPECIES - Likelihood of species habitats overlapping with areas expected to be impacted by management activities and whether those species and/or their habitats would be vulnerable to any effects.

Species	Exposure	Potential response to selected management activities[4]	Level of risk [5]
Bald eagle	Possible Broadly distributed and high overlap with IRAs. Possible overlap w/ timber cutting activities (particularly fuels work)	Severity – low, Likelihood - Possible Habitat could be altered (removal of nest/roost trees and snags) and management can disturb nesting and foraging activities of some individuals. Avoidance of nest trees, snag retention measures, and limited operating procedures near known eagle nests can reduce likelihood of these effects.	Low
Canada lynx	Likely High overlap with IRAs, timber harvest activities, and discretionary mining	Severity – Moderate, Likelihood - Possible Habitat loss, degradation, and fragmentation. Increased mortality from incidental trapping facilitated by roads. Could benefit from some timber cutting regimes that create early successional habitats that support snowshoe hares.	Moderate
Gray Wolf	Likely High overlap with IRAs and timber harvest activities.	Severity – Moderate, Likelihood - Possible Increased mortality due to collisions with cars and increased encounters with people facilitated by roads. Human disturbance can contribute to habitat loss/degradation and fragmentation.	Moderate
Grizzly bear	Likely High overlap with IRAs where they occur	Severity – High, Likelihood - Likely Increased mortality due to human-bear encounters facilitated by roads and collisions. Habitat loss, degradation, and fragmentation via behavioral avoidance of human activities. Can benefit from some vegetation treatments that can increase production of soft mast or restore white-bark pine stands.	High
Northern Idaho ground squirrel	Possible 26% of it's limited distribution overlaps IRA. Overlap with roads needed to facilitate timber cutting.	Severity – Moderate, Likelihood - unlikely Mortality due to recreational shooting which could be facilitated by roads, but likelihood is low. Limited habitat loss and degradation due to roads. Vegetation treatments designed to restore meadows and open forest stands could benefit this species.	Moderate
Woodland Caribou	Likely 28% of predicted distribution in IRAs. Likely overlap with timber cutting.	Severity – Moderate, Likelihood - possible Habitat loss, fragmentation due to timber cutting and human disturbance. Increased mortality due to collisions with cars, increased poaching facilitate by roads.	Moderate

4 Based on Wisdom et al. 2000 and other supporting literature.

5 Based on assumption that species specific protective measures will be incorporated into all site-specific management activities.

Table C-2 FOREST SENSITIVE SPECIES – Likelihood of species habitats overlapping with areas expected to be impacted by management activities and whether those species and/or their habitats would be vulnerable to any effects.

SPECIES	Exposure	Potential response to selected management activities[6]	Level of risk [7]
American peregrine falcon	Possible Broad habitat associations	Severity – low, Likelihood - unlikely May be sensitive to human disturbance in more remote areas. Roads facilitate human access which could lead to targeted shooting, however this is likely to be extremely infrequent.	*Low*
Black swift	Unlikely Generally, habitat is unlikely to overlap with timber cutting, roads, or mining.	Severity – low, likelihood - unlikely May be sensitive to human recreation (rock climbing) that could be facilitated by roads, but few observations supporting this.	*Low*
Black-backed woodpecker	Likely	Severity – moderate, likelihood - likely Habitat loss, degradation, and fragmentation, removal of snags, particularly smaller diameter trees where they nest.	*High*
Boreal owl	Likely High overlap with IRAs. Likely to overlap with timber cutting activities.	Severity – moderate, likelihood - likely Habitat loss, degradation, and fragmentation contributing to changes to prey base due to timber cutting, removal of snags due to firewood collecting (cavity nester).	*Moderate*
Columbian sharp-tailed grouse	Likely Potential for overlap on phosphate areas on the Caribou	Severity – moderate, likelihood - possible Habitat loss and degradation. Also, sensitive to human disturbances from roads and associated developments particularly during lekking.	*Moderate*
Common loon	Unlikely Habitat will not likely overlap with timber cutting, roads or mining.	Severity – low, likelihood - unlikely Could be impacted by increased recreation around lake environments that might be facilitated by roads.	*Low*
Fisher	Likely High overlap with IRAs. Found in habitats likely to be impacted by timber cutting.	Severity – moderate, likelihood - possible Habitat loss, degradation and fragmentation due to timber cutting, increased trapping and removal of snags and downed logs for firewood.	*Moderate*
Flammulated	Likely	Severity – moderate, likelihood - high	*High*

[6] Based on Wisdom et al. 2000 and other supporting literature.
[7] Based on assumption that species specific protective measures will be incorporated into all site-specific management activities.

SPECIES	Exposure	Potential response to selected management activities[6]	Level of risk [7]
owl	High overlap with IRAs (26%) and overlap with timber cutting activities and discretionary mining.	Habitat loss, degradation (including changes to prey base), and fragmentation due to timber cutting, removal of snags due to firewood collecting (cavity nester).	
Fringed myotis	Unlikely limited overlap with IRAs and management activities	Severity – Moderate, likelihood - low Habitat loss and degradation due to timber cutting and loss of snags affecting roost availability. Human disturbance facilitated by roads.	*Low*
Great gray owl	Likely	Severity – Moderate, Likelihood - possible Habitat loss, degradation and fragmentation due to timber cutting, loss of snags. Timber cutting could be beneficial to maintaining/restoring meadow habitats where conifers are encroaching.	*Moderate*
Greater Sage grouse	Likely 6% overlap of distribution with IRAs. Likely overlap with phosphate development	Severity – Moderate, likelihood - possible Habitat loss, degradation, and fragmentation due to roads and invasion of cheatgrass. Timber cutting might be more limited. Sensitive to human disturbance particularly during lekking.	*Moderate. -*
Grizzly bear	Likely	Severity – High, Likelihood - Likely Increased mortality due to human-bear encounters facilitated by roads and collisions. Habitat loss, degradation, and fragmentation via behavioral avoidance of human activities. Can benefit from some vegetation treatments that can increase production of soft mast or restore white-bark pine stands..	*High*
Harlequin duck	Unlikely – habitat not likely to overlap activities.	Severity – low, likelihood - unlikely	*Low*
American Marten	Likely 33% of pred. dist. In Idaho in IRAs	Severity – moderate, likelihood - likely Habitat loss, degradation and fragmentation due to timber cutting, roads facilitate increased trapping and removal of snags and downed logs for firewood.	*Moderate*
Mountain plover	Possible	Severity - ?, Likelihood - ?	*Low?*
Mountain quail	Unlikely only 10% of predicted distribution overlaps IRAs,	Severity – moderate, likelihood - unlikely Habitat degradation, increased mortality facilitated by roads.	*Low*
Northern bog lemming	Possible	Severity – moderate, likelihood - possible Habitat disturbance from timber harvest and roads. Very limited distribution in Idaho, of which 26% overlaps IRAs	*Moderate*

SPECIES	Exposure	Potential response to selected management activities[6]	Level of risk [7]
Northern goshawk	Likely Occur throughout forested areas. 32% of species distribution in Idaho overlaps IRAs so management is important.	Severity – moderate, likelihood - likely Habitat loss, degradation, and fragmentation due to timber cutting. Existing conservation measures should protect nesting habitat, but degradation and loss of foraging habitat, as well as fragmentation still possible.	*Moderate*
Pygmy nuthatch	Possible	Severity – moderate, likelihood – possible Habitat loss, degradation, and fragmentation due to timber cutting	*Moderate*
Ring-necked snake	Unlikely Low overlap with IRAs	Severity - High, likelihood – unlikely Increased mortality due to crushing on roads.	*Low*
Pygmy rabbit	Possible Although somewhat low overlap with IRAs	Severity – moderate, likelihood - possible Habitat loss, degradation, and fragmentation due to roads and invasion of cheatgrass. Roads could facilitate coyote movement and increase predation rates?	*Low-moderate*
Spotted bat	Unlikely very limited overlap with IRAs (2%).	Severity – unknown, likelihood - ?	*Low*
Three-toed woodpecker	Likely 35% overlap of predicted distribution in IRAs.	Severity – moderate, likelihood - likely Habitat loss, degradation, and fragmentation. In particular, loss of snags due to timber cutting, salvage, fuels reduction firewood collection, may negatively impact.	*High*
Townsend's big-eared bat	Possible But very limited overlap with IRAs (3.3%)	Severity – low, likelihood - unlikely Human disturbance from roads, mining, or timber cutting nears roost sites and nursery colonies.	*Low*
Trumpeter swan	Unlikely Habitat not likely to overlap with management activities	Severity – low, likelihood – unlikely	*Low*
White-headed woodpecker	Likely occurs in pp and mixed conifer where timber cutting and roads likely	Severity – Moderate, likelihood - likely Loss of snags due to timber cutting, firewood collection, facilitated by roads. However, some veg. trt to reduce stand-replacing fires in old pp and to enhance devt of pp could improve conditions for this species.	*Moderate*
Wolverine	Likely High overlap with IRAs and management activities	Severity – moderate, Likelihood - possible Loss of snags, and logs due to timber cutting, salvage, etc, incidental trapping (facilitated by roads) and sensitive to human disturbance. 42% predicted distribution w/in IRAs.	*Moderate*

Table C-3 MIS SPECIES - Likelihood of species habitats overlapping with areas expected to be impacted by management activities and whether those species and/or their habitats would be vulnerable to any effects. MIS species addressed under T, E, or S are not included below.

Species	Exposure	Potential response to selected management activities[1]	Risk to species[2]
Belted kingfisher	Unlikely Habitat not likely to overlap with activities	Severity – low, likelihood - unlikely	low
Downy woodpecker	Likely	Severity - moderate , Likelihood – likely Habitat loss, degradation, and fragmentation, removal of snags,	moderate
Elk	Likely High overlap with IRAs and management activities	Severity – moderate, likelihood – possible. Habitat loss, degradation, increased mortality facilitated by roads. This species can also benefit from timber cutting activities.	Moderate
Hairy woodpecker	Likely	Severity - moderate, Likelihood – likely Habitat loss, degradation, and fragmentation, removal of snags	Moderate
Moose	Possible Species considered relatively ubiquitous, habitat could overlap management activities	Severity - moderate , likelihood – possible Habitat degradation, disturbance, increased mortality facilitated by roads.	moderate
Northern Flicker	Likely	Severity - low, Likelihood – likely Habitat degradation via timber cutting and vegetation management. But habitat generalist so unlikely that impact will be significant to individuals	Low
Red Squirrel	Likely	Severity - low , Likelihood – possible Habitat degradation via timber cutting. But habitat generalist so unlikely that impact will be significant to individuals.	Low
Red-naped sapsucker	Likely	Severity - moderate, Likelihood – possible Habitat loss, degradation, and fragmentation, removal of snags	Low-moderate

[1] *Based on Wisdom et al. 2000 and other supporting literature.*

[2] *Based on assumption that species specific protective measures will be incorporated into all site-specific management activities.*

Appendix D. Predicted distributions by theme

Appendix D. Acres and percentage of each species' predicted distributions that overlap with Idaho Roadless Areas for each theme and alternative*

Species (NFS acres in Idaho)	2001 Roadless Rule	Existing Plans					Idaho Roadless Rule					
		WLR	Primitive	BCR	GFRG	FPSA	WSR	Primitive	BCR	GFRG	FPSA	SAHTS
	----Acres---- (percent)											
American peregrine falcon (34,165,500)	7,716,500 (22.6)	1,007,500 (2.9)	1,884,000 (5.5)	3,464,200 (10.1)	1,076,500 (3.2)	284,300 (0.8)	1,044,000 (3.1)	1,569,500 (4.6)	4,216,300 (12.3)	581,400 (1.7)	284,300 (0.8)	21,000 (0.1)
Bald eagle (9,067,100)	2,704,900 (29.8)	351,600 (3.9)	618,500 (6.8)	1,205,600 (13.3)	342,500 (3.8)	186,700 (2.1)	358,000 (3.9)	473,600 (5.2)	1,559,500 (17.2)	104,900 (1.2)	186,700 (2.1)	22,200 (0.2)
Belted kingfisher (303,300)	36,100 (11.9)	3,700 (1.2)	8,100 (2.7)	12,800 (4.2)	3,300 (1.1)	8,300 (2.7)	3,700 (1.2)	6,000 (2.0)	16,000 (5.3)	2,000 (0.7)	8,300 (2.7)	0 (0.0)
Black swift (11,371,600)	3,280,500 (28.8)	468,900 (4.1)	524,200 (4.6)	1,762,700 (15.5)	390,100 (3.4)	134,600 (1.2)	508,200 (4.5)	299,200 (2.6)	2,257,900 (19.9)	19,500 (0.2)	134,600 (1.2)	61,100 (0.5)
Black-backed woodpecker (16,780,100)	5,223,800 (31.1)	716,800 (4.3)	1,203,200 (7.2)	2,472,400 (14.7)	642,700 (3.8)	188,700 (1.1)	743,700 (4.4)	927,400 (5.5)	3,218,500 (19.2)	84,100 (0.5)	188,700 (1.1)	61,400 (0.4)
Boreal owl (18,584,500)	6,111,800 (32.9)	842,100 (4.5)	1,318,900 (7.1)	2,881,600 (15.5)	839,200 (4.5)	230,000 (1.2)	871,700 (4.7)	1,007,100 (5.4)	3,670,800 (19.8)	269,800 (1.5)	230,000 (1.2)	62,400 (0.3)
Canada lynx (12,364,800)	3,740,800 (30.3)	408,500 (3.3)	831,500 (6.7)	1,729,500 (14.0)	648,500 (5.2)	122,800 (1.0)	434,200 (3.5)	554,500 (4.5)	2,482,400 (20.1)	85,000 (0.7)	122,800 (1.0)	61,900 (0.5)
Columbian sharp-tailed grouse (8,771,700)	531,900 (6.1)	7,700 (0.1)	39,600 (0.5)	287,400 (3.3)	179,100 (2.0)	18,100 (0.2)	7,600 (0.1)	38,700 (0.4)	289,200 (3.3)	178,300 (2.0)	18,100 (0.2)	0 (0.0)
Common loon (566,700)	13,800 (2.4)	5,100 (0.9)	2,800 (0.5)	4,600 (0.8)	100 (0.0)	1,200 (0.2)	4,900 (0.9)	2,100 (0.4)	5,500 (1.0)	100 (0.0)	1,200 (0.2)	0 (0.0)
Downy woodpecker (19,569,100)	5,784,200 (29.6)	760,100 (3.9)	1,306,000 (6.7)	2,673000 (13.7)	818,200 (4.2)	226,200 (1.2)	790,700 (4.0)	1,022,200 (5.2)	3,406,900 (17.4)	277,100 (1.4)	226,200 (1.2)	61,100 (0.3)
Elk (36,990,600)	8,869,100 (24)	1,171,500 (3.2)	2,071,000 (5.6)	4,105,300 (11.1)	1,191,400 (3.2)	329,800 (0.9)	1,236,500 (3.3)	1,607,800 (4.3)	5,078,000 (13.7)	549,400 (1.5)	329,900 (0.9)	67,500 (0.2)
Fisher	3,601,500	484,500	859,200	1,703,400	416,000	138,400	486,800	673,100	2,169,000	72,300	138,400	61,900

Species (NFS acres in Idaho)	2001 Roadless Rule	Existing Plans					Idaho Roadless Rule					
		WLR	Primitive	BCR	GFRG	FPSA	WSR	Primitive	BCR	GFRG	FPSA	SAHTS
	---Acres---											
	---(percent)---											
(11,889,600)	(30.3)	(4.1)	(7.2)	(14.3)	(3.5)	(1.2)	(4.1)	(5.7)	(18.2)	(0.6)	(1.2)	(0.5)
Flammulated owl (9,136,900)	2,395,200 (26.2)	233,900 (2.6)	548,600 (6.0)	1,067,500 (11.7)	434,900 (4.8)	110,300 (1.2)	242,800 (2.7)	477,500 (5.2)	1,347,300 (14.7)	201,700 (2.2)	110,300 (1.2)	15,600 (0.2)
Fringed myotis (3,621,800)	122,900 (3.4)	0 (0.0)	59,500 (1.6)	49,300 (1.4)	6,300 (0.2)	7,800 (0.2)	0 (0.0)	49,900 (1.4)	65,100 (1.8)	0 (0.0)	7,800 (0.2)	0 (0.0)
Gray wolf (16,654,500)	5,669,600 (34.0)	861,400 (5.2)	1,381,100 (8.3)	2,610,500 (15.7)	614,300 (3.7)	202,300 (1.2)	888,300 (5.3)	1,159,500 (7.0)	3,264,300 (19.6)	87,700 (0.5)	202,300 (1.2)	67,500 (0.4)
Great gray owl (18,909,400)	5,940,500 (31.4)	856,900 (4.5)	1,118,400 (5.9)	2,854,400 (15.1)	875,300 (4.6)	235,500 (1.2)	885,900 (4.7)	836,500 (4.4)	3,593,000 (19.0)	325,900 (1.7)	235,500 (1.2)	63,700 (0.3)
Greater sage grouse (21,424,200)	1,294,800 (6.0)	104,500 (0.5)	356,100 (1.7)	565,500 (2.6)	237,600 (1.1)	31,100 (0.1)	132,400 (0.6)	261,700 (1.2)	666,800 (3.1)	202,800 (0.9)	31,100 (0.1)	0 (0.0)
Grizzly bear (2,012,500)	337,400 (16.8)	54,300 (2.7)	126,400 (6.3)	114,500 (5.7)	15,700 (0.8)	26,500 (1.3)	63,200 (3.1)	37,800 (1.9)	191,300 (9.5)	18,600 (0.9)	26,500 (1.3)	0 (0.0)
Hairy woodpecker (20,243,500)	6,460,900 (31.9)	880,300 (4.3)	1,361,000 (6.7)	3,058,000 (15.1)	919,700 (4.5)	241,900 (1.2)	908,400 (4.5)	1,042,900 (5.2)	3,858,200 (19.1)	346,700 (1.7)	241,900 (1.2)	62,800 (0.3)
Harlequin duck (1,560,100)	420,800 (27.0)	53,600 (3.4)	67,600 (4.3)	212,700 (13.6)	53,900 (3.5)	33,000 (2.1)	55,700 (3.6)	30,600 (2.0)	270,000 (17.3)	19,100 (1.2)	33,000 (2.1)	12,400 (0.8)
Pine marten (18,361,800)	6,098,400 (33.2)	869,000 (4.7)	1,333,200 (7.3)	2,882,400 (15.7)	778,600 (4.2)	235,200 (1.3)	897,400 (4.9)	1,016,400 (5.5)	3,678,400 (20.0)	208,500 (1.1)	235,200 (1.3)	62,500 (0.3)
Moose (19,657,700)	6,466,000 (32.9)	891,700 (4.5)	1,360,500 (6.9)	3,059,200 (15.6)	903,800 (4.6)	250,800 (1.3)	920,900 (4.7)	1,036,900 (5.3)	3,864,400 (19.7)	330,400 (1.7)	250,800 (1.3)	62,600 (0.3)
Mountain quail (6,654,300)	697,200 (10.5)	114,600 (1.7)	336,900 (5.1)	184,400 (2.8)	17,000 (0.3)	44,300 (0.7)	116,600 (1.8)	362,900 (5.5)	168,700 (2.5)	4,700 (0.1)	44,300 (0.7)	0 (0.0)
Northern bog lemming (547,900)	132,200 (24.1)	28,300 (5.2)	26,200 (4.8)	55,100 (10.1)	8,800 (1.6)	13,800 (2.5)	36,700 (6.7)	6,000 (1.1)	63,600 (11.6)	12,100 (2.2)	13,800 (2.5)	0 (0.0)
Northern flicker (51,744,300)	8,954,900 (17.3)	1,616,1 00 (2.2)	2,091,200 (4.0)	4,127,300 (8.0)	1,246,500 (2.4)	328,800 (0.6)	1,225,6 00 (2.4)	1,629,800 (3.1)	5,098,700 (9.9)	604,400 (1.2)	328,800 (0.6)	67,600 (0.1)
Northern	6,436,700	877,100	1,356,700	3,044,900	916,500	241,500	905,600	1,039,600	3,841,500	345,900	241,500	62,600

Species (NFS acres in Idaho)	2001 Roadless Rule	Existing Plans					Idaho Roadless Rule					
		WLR	Primitive	BCR	GFRG	FPSA	WSR	Primitive	BCR	GFRG	FPSA	SAHTS
	-----*Acres*----- -----*(percent)*-----											
goshawk (19,822,600)	(32.5)	(4.4)	(6.8)	(15.4)	(4.6)	(1.2)	(4.6)	(5.2)	(19.4)	(1.7)	(1.2)	(0.3)
Northern Idaho ground squirrel (847,300)	220,900 (26.1)	21,700 (2.6)	97,900 (11.6)	85,300 (10.1)	900 (0.1)	15,100 (1.8)	21,700 (2.6)	108,900 (12.9)	74,400 (8.8)	800 (0.1)	15,100 (1.8)	0 (0.0)
Pileated woodpecker (17,266,400)	5,535,200 (32.1)	794,100 (4.6)	1,245,300 (7.2)	2,594,800 (15.0)	698,500 (4.0)	202,500 (1.2)	824,400 (4.8)	954,000 (5.5)	3,363,400 (19.5)	128,440 (0.7)	202,500 (1.2)	62,500 (0.4)
Pygmy nuthatch (000,000)	1,107,800 (22.0)	108,800 (2.2)	334,600 (6.7)	470,400 (9.4)	177,700 (3.5)	16,300 (0.3)	113,800 (2.3)	297,300 (5.9)	652,000 (12.3)	33,800 (0.7)	1,100 (0.0)	0 (0.0)
Pygmy rabbit (13,948,900)	961,500 (6.9)	40,000 (0.3)	261,300 (1.9)	488,400 (3.2)	201,800 (1.4)	10,000 (0.1)	71,100 (0.5)	158,200 (11.3)	551,500 (4.0)	170,700 (1.2)	10,000 (0.1)	0 (0.0)
Red squirrel (19,001,700)	6,302,300 (33.2)	868,300 (4.6)	1,336,300 (7.0)	2,980,300 (15.7)	881,800 (4.6)	235,600 (1.2)	898,000 (4.7)	1,019,500 (5.4)	3,774,700 (19.9)	311,900 (1.6)	235,600 (1.2)	62,600 (0.3)
Red-napped sapsucker (20,152,400)	6,442,000 (32.0)	877,100 (4.4)	1,357,000 (6.7)	3,046,300 (15.1)	920,000 (4.6)	241,600 (1.2)	905,600 (4.5)	1,039,900 (5.2)	3,845,300 (19.1)	347,000 (1.7)	241,600 (1.2)	62,600 (0.3)
Ringneck snake (1,533,200)	97,800 (6.4)	1,200 (0.1)	4,600 (0.3)	53,300 (3.5)	35,800 (2.3)	2,900 (0.2)	1,200 (0.1)	4,700 (0.3)	54,700 (3.6)	34,300 (2.2)	2,900 (0.2)	0 (0.0)
Spotted bat (5,755,800)	109,600 (1.9)	0 (0)	52,200 (0.9)	16,300 (0.3)	40,700 (0.7)	400 (0)	0 (0)	52,200 (0.9)	16,300 (0.3)	40,700 (0.7)	400 (0)	0 (0.0)
Three-toed woodpecker (7,596,100)	2,639,600 (34.7)	368,200 (4.8)	661,700 (8.7)	1,215,900 (16.0)	306,800 (4.0)	87,000 (1.1)	379,600 (5.0)	539,900 (7.1)	1,543,900 (20.3)	53,800 (0.7)	87,000 (1.1)	35,400 (0.5)
Townsend's big-eared bat (3,604,100)	120,400 (3.3)	0 (0.0)	57,900 (1.6)	48,900 (1.4)	5,900 (0.2)	7,700 (0.2)	0 (0.0)	49,000 (1.4)	63,600 (1.8)	0 (0.0)	7,700 (0.2)	0 (0.0)
Trumpeter swan (202,300)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
White-headed woodpecker (4,772,000)	1,067,400 (22.4)	109,100 (2.3)	368,500 (7.7)	455,200 (9.5)	72,700 (1.5)	61,900 (1.3)	108,600 (2.3)	355,900 (7.5)	516,300 (10.8)	18,400 (0.4)	61,900 (1.3)	6,300 (0.1)

Species (NFS acres in Idaho)	2001 Roadless Rule	Existing Plans					Idaho Roadless Rule					
		WLR	Primitive	BCR	GFRG	FPSA	WSR	Primitive	BCR	GFRG	FPSA	SAHTS
	---Acres--- (percent)											
White-tailed deer (23,210,600)	5,842,200 (25.2)	844,000 (3.6)	1,235,700 (5.3)	2,815,600 (12.1)	697,500 (3.0)	249,400 (1.1)	869,300 (3.7)	961,100 (4.1)	3,537,200 (15.2)	157,700 (0.7)	249,400 (1.1)	67,500 (0.3)
Williamson's sapsucker (15,595,900)	4,888,800 (31.3)	593,700 (3.8)	1,135,800 (7.3)	2,198,000 (14.1)	774,100 (5.0)	187,200 (1.2)	599,200 (3.8)	976,900 (6.3)	2,779,000 (17.8)	322,100 (2.1)	187,200 (1.2)	24,400 (0.2)
Wolverine (13,746,000)	5,755,400 (41.9)	997,200 (7.3)	1,248,300 (9.1)	2,642,900 (19.2)	692,400 (5.0)	174,600 (1.3)	1,021,500 (7.4)	986,800 (7.2)	3,335,900 (24.3)	179,400 (1.3)	174,600 (1.3)	57,200 (0.4)
Woodland caribou (446,300)	128,500 (28.8)	30,700 (6.9)	26,700 (6.0)	51,300 (11.5)	7,100 (1.6)	12,700 (2.8)	41,200 (9.2)	6,100 (1.4)	57,500 (12.9)	11,000 (2.5)	12,700 (2.8)	0 (0.0)

** Figures for the mountain plover were not available.*